

THE MONIST

A QUARTERLY MAGAZINE.

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THE MONIST.

ON THE STEREOSCOPIC APPLICATION OF ROENTGEN'S RAYS.¹

THIRTY years ago I described in the *Proceedings of the Vienna Academy of Sciences*² a procedure for obtaining transparent stereoscopic pictures of invisible bodies, machines, anatomical objects, and so forth. The stereoscopic impression is interrupted, a part of the object is withdrawn, the exposure is repeated, and so on, as often as is necessary. In this manner parts normally concealed or enclosed are made to appear on the picture with perfect distinctness.³

¹Communicated as a comment on the article in No. 441 of *The Open Court*, "The New X-Rays."

²"Ueber wissenschaftliche Anwendungen der Photographie und Stereoscopie." Sitzung vom 11ten Mai, 1866.

³See my *Popular Scientific Lectures*, Chicago, Open Court Publishing Company, 1895, page 73. The passage runs substantially as follows:

"The stereoscope can visualise for us things which we never see with equal clearness in real objects. You know that if you move around much while your photograph is being taken, your picture will come out like that of a Hindu deity, with several heads or several arms, which, at the spaces where they overlap, show forth with equal distinctness, so that we seem to see the one picture *through* the other. If a person moves quickly away from the camera before the impression is completed, the objects behind him will also be imprinted upon the photograph; the person will look transparent. Photographic ghosts are made in this way.

"Some very useful applications may be made of this discovery. For example, if we photograph a machine stereoscopically, successively removing during the operation the single parts (where of course the impression suffers interruptions), we obtain a transparent view, endowed with all the marks of spatial solidity, in which is distinctly visualised the interaction of parts normally concealed. I have employed this method for obtaining transparent stereoscopic views of anatomical structures."

At the time, I could not have foreseen that this procedure, which furnishes wonderful results, but frequently entails great labor, should be destined to undergo so striking a simplification.

When Röntgen's discovery was made known, I requested Dr. I. M. Eder, of Vienna,—for I am not now in a position myself to undertake experiments in photography,—to attempt a stereoscopic photograph with the x -rays, which he performed with beautiful and successful results (February 13, 1896). Since lenses cannot be employed in this process, resource was had to the following procedure.

A mouse was placed on a piece of black cardboard, beneath which lay a photographic plate, and the whole was irradiated by a Crookes's tube. Then, without disturbing the mouse, the plate was changed and the position of the Crookes's tube shifted. The two photographic shadow-pictures, thus obtained from two different points, could now be combined into a phantom-picture of the mouse, in which the whole skeleton appears in marvellously distinct and solid outlines. By the injection of substances into the blood-vessels, these also could be obtained.

The pictures obtained in this manner would never, of course, rival the perfection of the photographs taken by my old method, but on the other hand, the process is incomparably simpler, it necessitates no detailed preparations, and, most important of all, in many cases, photographs by it may be obtained of a living, undissected man.

Naturally I have also attempted to obtain two Röntgen shadow-pictures of the same anatomical object on a fluorescent screen, and by the intermediation of photography to combine the two directly into a stereoscopic result. But the attempt failed, owing to the weakness of the fluorescence even at short distances from the source of radiation. Beyond doubt, however, means will be devised for augmenting the fluorescent effect, probably by the construction of windows of different material from glass, which greatly obstructs the passage of the x -rays and permits only a small fraction of their effect to issue from the Crookes's tube. Then a surgeon may obtain a direct stereoscopic view, say, of a stone in the bladder and of the position of his operating instrument.

It is difficult to determine whether the x -rays are longitudinal. Since they can neither be refracted nor reflected, there is little hope of their being polarised. But so long as the *absence* of polarisation is not demonstrated, it cannot be asserted that the x -rays are longitudinal.

The x -rays cannot consist of isolated impacts, as Huygens conceived light; but they must be *periodic* and *short-waved*, for otherwise such sharp shadows could not be produced. As yet, no diffraction has been shown.

The non-appearance of diffraction-bands might be explained by composition from widely-varying wave-lengths. But the separation of the wave-lengths by absorption also appears to present formidable difficulties. There can scarce be a thought of short-waved ultra-violet light, for ultra-violet light can be refracted, and just the shortest waves are absorbed by thin laminæ of air. In fact, the question grows constantly more difficult and more interesting. Rarely has a discovery so fascinated me, and I should take great pleasure in experimenting on these questions, were that not primarily Röntgen's own privilege.

E. MACH.

VIENNA.

ON THE NATURE OF ROENTGEN'S RAYS.

RARELY has a scientific discovery provoked such a stir in the world as that made in Würzburg in December last by Professor Röntgen. Although Röntgen is a native Dutchman, he received his education and pursued his academic career entirely in German universities. A genuine German scholar, he was modest enough not to furnish the news of his surprising discovery immediately to the public at large, but contented himself with addressing his communication to the proper quarters—to his professional colleagues. It thus happened that scientists were the first to hear of the discovery, which was published in the Proceedings of the Würzburg Physical and Medical Society in December, 1895, under the title "A New Kind of Rays." Röntgen, however, had scarce communicated his discovery to his colleagues before the papers took up the interesting questions which it offered, and in a few weeks the entire civilised world was familiar with its character.

Doubtless many a newspaper reader shook his head dubiously on hearing of the discovery, and may have gone so far as to denounce it as an imposture. But when reproductions of pictures taken by Röntgen's rays appeared in the periodicals and in the show windows, and when the German Emperor invited Röntgen to Potsdam to deliver an experimental lecture on the new "energy," the final doubts in the public mind were removed; there was no thought of imposture, and it was recognised that we were confronted in Röntgen's rays with a discovery of stupendous scope.

Every educated man in the world now knows that physicists are able to produce invisible rays which have the power of penetrating more or less readily all substances, whether opaque or not,

and, having passed through them, of indicating on sensitive photographic plates, by the lightness or darkness of their impressions, whether they have passed through a great deal or only a little of the intervening substance, just as in photography heavy-black or light-black impressions of the plate show whether the rays have emanated from bright or from dark spots on the object to be photographed. But though this fact is familiar to every one, the previous history of the new physical agent and our surmises as to its character are unknown to the great majority of unprofessional readers, and to clear up this matter will be the object of the following pages, wherein we shall have to leave unnoticed the possible applications of the new discovery to anatomy and surgery, as these have already been sufficiently exploited in the press.

In the year 1789 the electric current was discovered by Galvani, of Bologna; but it was not until several years later that its most important properties, at least as distinguished from frictional electricity, were disclosed by Volta. Although galvanic batteries as a means of producing electric currents were studied and perfected in the next few decades, three great discoveries had yet to be made in the province of electricity before the new agent could attain the importance in civilised life which it to-day occupies, and before theoretical physics could investigate more closely its nature and character. These three discoveries were as follows :

1. In 1820 Oerstedt, of Copenhagen, discovered that an electric current flowing round a magnetic needle deflects the same, and that a magnetic needle rendered insusceptible to the influences of terrestrial magnetism and free to rotate in any direction, will place itself at right angles to the plane of an electric current surrounding it.

2. In 1825 Arago, of Paris, discovered that a piece of soft iron, about which a wire connected with a battery has been wound in spirals, is transformed into a magnet and continues in the magnetic condition as long as the circuit remains closed, but is again unmagnetised when the circuit is broken.

3. In 1831 Faraday, of London, discovered the so-called *induced currents* of electricity. If, he reasoned, the current was a source of magnetising action, as Arago had discovered, it was pos-

sible conversely that a magnet should be the source of a current-producing action. But Faraday found no confirmation of his conjecture. Twenty years later it could have been decided *a priori*, without experiment, that a magnet *at rest* could not give rise to a current. For that would have violated the law of the conservation of energy, agreeably to which work can be done only provided a like quantity of work has been previously expended in some way. Yet Faraday discovered the law, harmonising perfectly with the principle of the conservation of energy, that if a magnet be *approached* to a closed spiral circuit it will evoke in the circuit a sudden current lasting only for the moment of approach, but that when the magnet is *drawn away* from the spiral, a current in the opposite direction to the first will be momentarily set up therein. Instead of a magnet, a closed circuit carrying a current may be approached and removed, or instead of the latter the current in the circuit may be made alternately to appear and disappear, or its strength may be alternately increased and diminished.

Currents thus produced are called *currents of induction*, and apparatus designed to generate induced currents, rapidly alternating in direction, by means of common currents, are called *induction-coils*. An induction-coil consists (1) of a soft iron core, (2) of a primary wire spiral or helix enveloping the same and receiving an ordinary electric current, and (3) of a secondary wire spiral of thin wire and many turns, enveloping the first. The current sent through the primary spiral magnetises the iron core (compare the first discovery). The magnetised core then attracts a little iron hammer which is placed before it and regulated by a spring. This movement of the hammer breaks the metallic connexion with the primary spiral so that the current is interrupted and the iron core again unmagnetised. The hammer immediately jumps back from the iron core, the current is again set going, and the action described is repeated anew. By this apparatus, thus, we are enabled to make the current in the primary spiral repeatedly and alternately appear and disappear. According to Faraday's laws, now, every appearance of the main current in the primary coil must produce in the secondary coil an induced or *closing current*, as it is 'called, flowing in the opposite

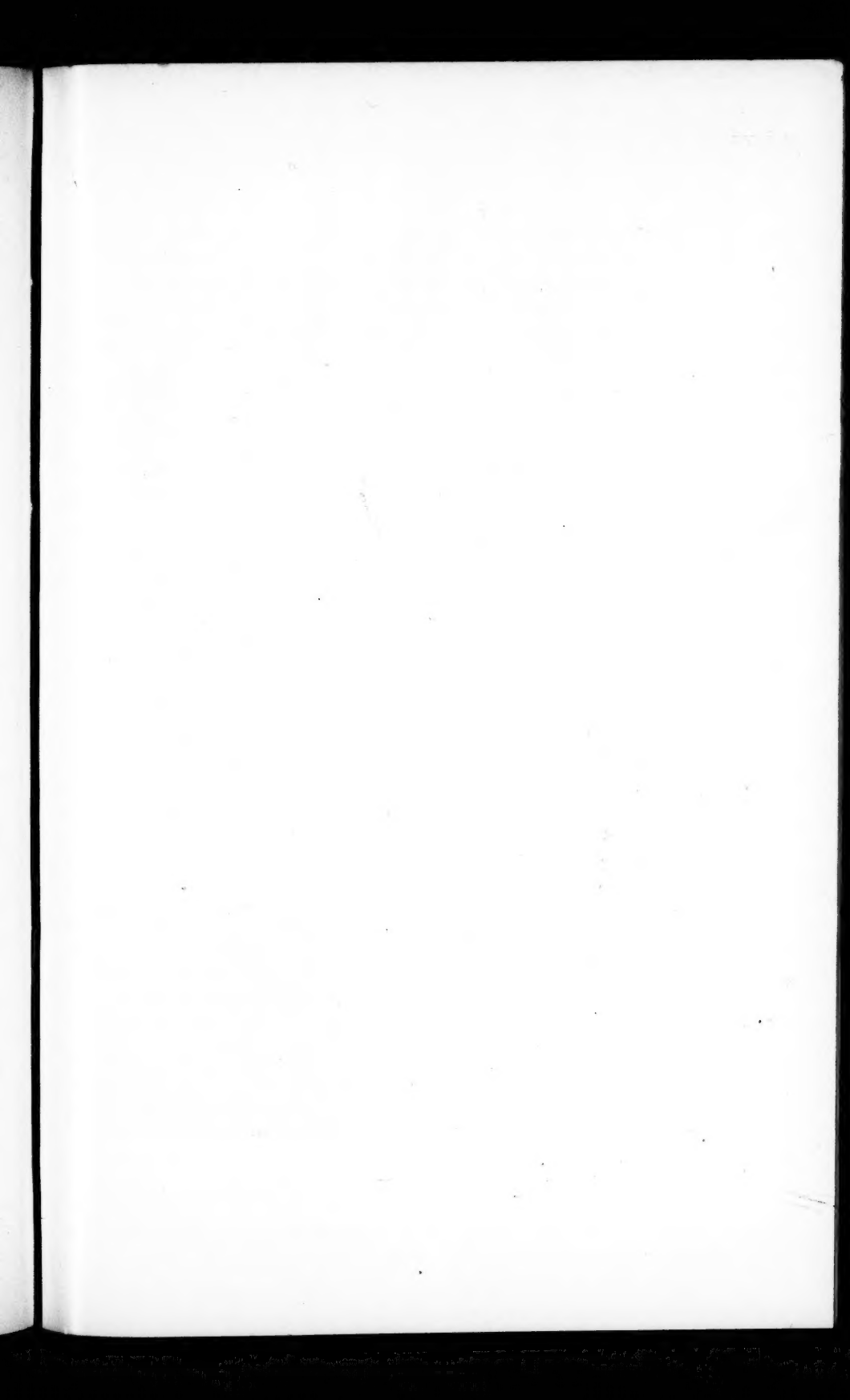
direction and lasting but for a moment; whilst conversely every disappearance of the current must evoke an induced current flowing in the same direction with the main current, and called the *opening current*. Thus are produced in the secondary spiral in quick succession currents which flow in alternately opposite directions. These induced currents are of brief duration, but of enormous tension. Their powerful physiological action on the human body is familiar to every reader.

It is to these induction currents, discovered by Faraday in 1831, that we owe all the recent magnificent development of electro-technics. For not only is the art of telephoning based upon induction effects, but the performances of large dynamos, or machines designed to produce by mechanical work electrical currents of great intensity and high tension, are primarily rendered possible by induction effects. Without the discovery of induction it would have been impossible to illuminate a large city by thousands of arc-lights and to have replaced horse-power by electricity in our street railways. And also the more theoretical branches of physics—the physics of the laboratory—was started on a laborious but fruitful path of inquiry by this discovery of Faraday, the last station attained on which is Röntgen's rays.

In the first place it was discovered that induced currents could bring to a state of incandescence rarefied gases enclosed in glass tubes. Along in the fifties, Geissler of Bonn succeeded with the help of a perfected mercury air-pump, in constructing tubes which exhibited this incandescence of enclosed gases in a marked and beautiful manner. Into the two ends of these tubes, which were named *Geissler's tubes* after their inventor, are soldered platinum wires, the terminals of which are called electrodes. If the tube be not too long and the induction current be powerful enough, the current will force a passage between the two electrodes and in so doing will set the enclosed gas through which it must pass, in a state of vivid incandescence. It is observed in the experiment that only the opening current and not the closing current has the power of producing this luminous effect. The closing current, in fact, is always considerably weaker than the opening current, for

the reason that it is set up in the direction opposite to that of the main current, whereby it detracts both from the strength of the latter and from itself. Consequently, inasmuch as the effect of the opening current is alone operative in Geissler's tubes, we can distinguish in this experiment between the two electrodes, seeing that one is the point of entrance and the other the point of exit of the positive current. The first is called the *anode* and the second the *cathode*. Now when induction-currents are passed through a Geissler's tube, a bright, narrow fringe is observed at the cathode and subsequently a relatively dark, bluish light, the *glow-light* or *cathode-light*, whilst at the anode as also in the largest part of the space intervening between the two electrodes striæ of bright and reddish-yellow light are distinctly visible.

In the year 1869, Hittorf, of Münster, dissatisfied with the degree of rarefaction attained by the Geissler tubes then in the market, arrived at new physical results by pushing the rarefactions of the tubes to a still minuter degree of density, amounting to more than the hundred-thousandth part of that of the ordinary atmosphere, and by substituting thin platinum plates for Geissler's platinum wire electrodes. It turned out that as the rarefaction increased, the bluish glow-light of the cathodes continued to spread, until it finally filled the whole interior of the tube. The phenomena which made their appearance on the passing of oscillatory induction-discharges through tubes containing such highly rarefied gases, were described by Hittorf in a paper which appeared in Poggendorf-Wiedemann's *Annalen* in 1869, and was entitled "On the Electric Conduction of Gases." Subsequently an English physicist, Crookes, made substantially the same observations, and founded upon them the hypothesis of the existence of a fourth aggregate state of matter. The bodies found in this state he called "radiant matter." This hypothesis was soon recognised to be untenable; but as Crookes knew better how to direct widespread attention to his work, the tubes exhibiting such phenomena have since been called Crookes's tubes, although it would have been more correct to have called them Hittorf's tubes. Latterly they have been called *vacuum-tubes*, as ex-

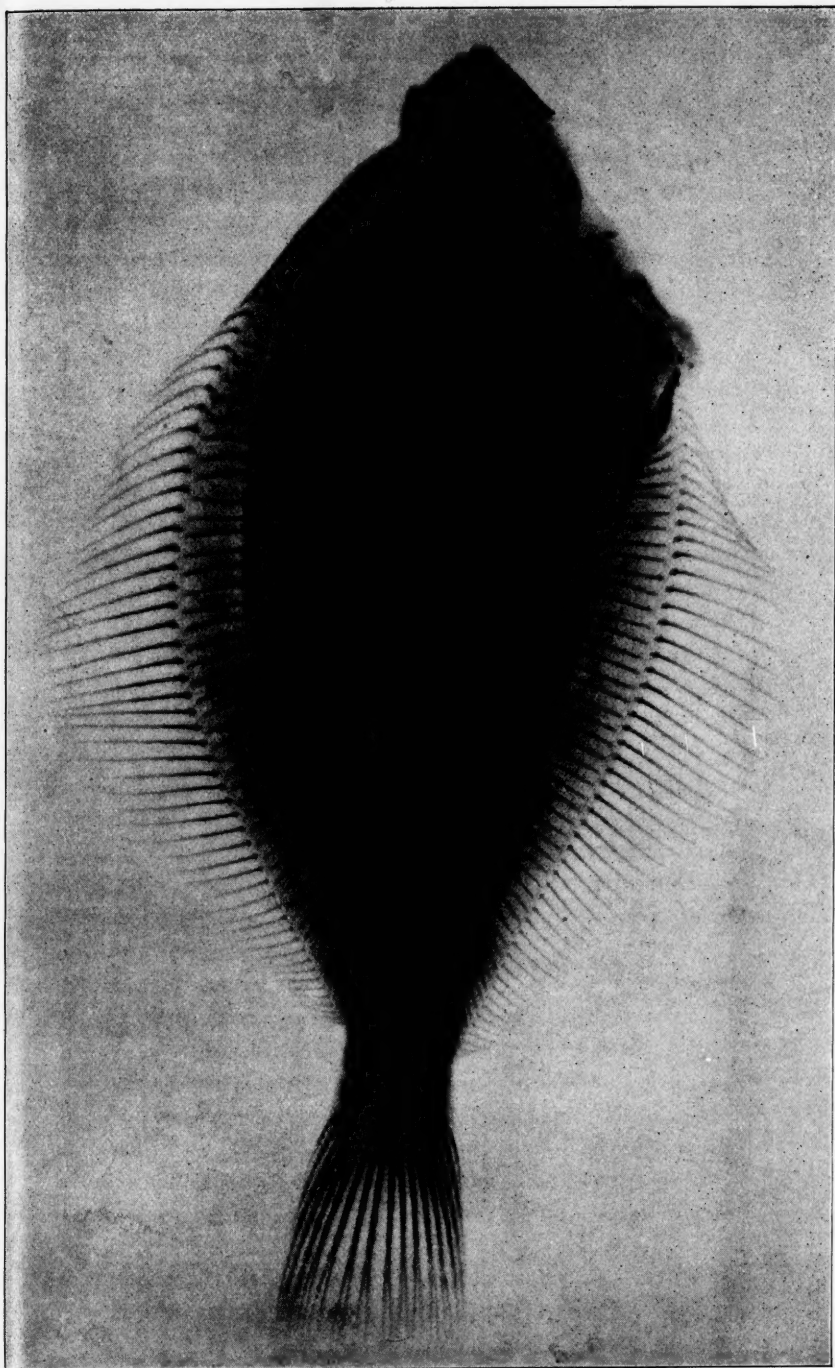




Actinogram of a lady's hand, showing the position of a needle broken off in the thumb and outwardly invisible. Taken by Roentgen's rays in the Physical State Laboratory at Hamburg, February 22, 1896.

(a) *Needle in the hand.* (b) *Common photograph of the needle after extraction.*

Ta
rus



Actinogram of a young plaice (*Platessa*) with shells in its intestines. Taken by Roentgen's rays in the Physical State Laboratory at Hamburg, February 21, 1896.

pressing the enormous degree of gaseous rarefaction attained in them.

One of the most striking properties of the cathode-light in vacuum-tubes is that wherever it strikes the glass it produces a vivid glow, termed fluorescence. Particularly remarkable, also, is the phenomenon, likewise observed by Hittorf, that the cathode-light unlike the induction-spark does not follow the curvature of the tube but is always propagated straight ahead in a *rectilinear* path. In all these cases, the cathode-ray itself is invisible; its existence is made known only upon its striking some substance, on which it excites the fluorescent effect.

Of the remaining properties of the cathode-light the following are important. It can set in motion easily-rotating bodies on which it impinges. Heat is generated at spots where its rays strike, at times in sufficient quantities to set metals aglow. If the cathode be concave in shape the course of the light will be the same as that of the paths of common luminous rays emitted from a reflector. Lastly, we will mention the effect produced on the glow-light of the cathode by magnets, which was first carefully studied by Plücker, and subsequently by Hittorf and Crookes. Exposed to the action of a magnet this light behaves like a thin rectilinear conductor carrying a current and having one of its terminals attached to the cathode, but with its other, as also with its entire flexible length, following the magnet, in utter disregard of the position it assumes relatively to the anode or positive electrode.

Despite all this knowledge scientists as yet had reached no positive conclusion regarding the nature of the cathode rays, although Hertz had rendered it probable that we were dealing here, not with paths of electric currents, but with genuine rays of light.

Such was the state of our knowledge touching these cathode-rays when Hertz made his pioneer experiments proving the undulatory mode of propagation of electricity and showing that both light and electricity were based upon wave-motions of the ether and differed only in respect of the wave-lengths being short for the first and long for the last.

What is the relation, now, of the cathode-rays to the new view

of Hertz, that light and electricity both have their origin in undulatory motions of the ether? There are two kinds of wave-motion—transverse and longitudinal. We have an example of transverse undulatory motion in waves of water, where each water-particle ascends and descends vertically whilst the wave itself is propagated in a horizontal direction. We have an example of longitudinal undulatory motion in waves of sound, where every air-particle moves backwards and forwards in the same line in which the sound is propagated, and where at the same spot alternate rarefactions and condensations of the air are produced.

Now ordinary luminous and electrical phenomena can be satisfactorily explained by the assumption of transverse waves in the ether, which is not the case, however, with the cathode-rays. On this account, Hertz, as we now know, once incidentally expressed in a lecture the opinion that the cathode-rays owed their origin to longitudinal electric waves.

Filled with such thoughts, Röntgen was conducting his experiments with good vacuum-tubes, for the purpose of experimentally ascertaining the nature of the cathode-rays. In the course of his work he found that *the cathode-rays were the generators of a new kind of rays, which, since they differed from the cathode-rays, he called x-rays.* The chief characteristics which distinguish the *x-rays* from the cathode-rays are, first, that the cathode-rays, as explained above, can be deflected by a magnet, while the *x-rays*, when exposed to the influence of the same, continue their course in a *rectilinear* path without taking the least notice of the magnet; secondly, that the *x-rays* penetrate more or less readily *all substances*, whether visible or invisible, whilst the cathode-rays, as Lenard has shown, although capable of penetrating substances, yet have so little of that power that there can scarce be a thought of their practical application. Consequently, the *x-rays* cannot be simply continuations of the cathode-rays, but must be an entirely new kind of rays, which at present we can only produce by means of the cathode-rays, but which it is quite possible may at some time or other be evoked by other means.

Common attributes of the two rays are, first, that they can be

neither regularly reflected nor refracted; and secondly, that they give rise to fluorescence. The point whence the x -rays originate is the spot where the cathode-rays strike the glass wall of the tube. From this point they are propagated in right lines in all directions. It is impossible to concentrate them by means of glass lenses, as is done with common light in photography, because they cannot be refracted. Nor is it possible to deflect them by a mirror, because they cannot be reflected. Hence, in order to make use of them, it is necessary in all cases to obtain a straight line between their point of origin on the wall of the vacuum-tube, the object which they are to penetrate, and the plate on which the effect is to be recorded. Owing to the conditions imposed by this requirement of rectilinearity between tube, object, and field of action, *a limit is set to the application of the method which cannot be surmounted.* Suppose, for instance, that a pickpocket is desirous of knowing what money I have in my purse; my trousers' pocket and my purse will offer no obstacle to him, but he will be considerably hindered by the necessity of getting a straight line between the vacuum-tube, the money in my pocket, and his eye, or rather the photographic plate held before his eye.

But contrasted with their inability to be reflected and refracted, which forms a serious hindrance to the practical application of the x -rays, stands their other property, which renders possible their application in all provinces—we refer to the fact that *all substances are pervious to them in a greater or less degree.* It appears that substances of high specific gravity absorb more of the effects of the x -rays than substances of low specific gravity, that is, are less pervious to them than the latter. For example, an aluminium plate must be three and one-half millimetres thick in order to absorb as much of the x -rays as a zinc plate one-tenth of a millimetre thick. Yet it is not to be supposed that the absorption of x -rays is proportional to the product of the thickness of the plate and the specific gravity of the substance of which it consists. All that is certain is that given the same thickness heavier substances absorb more than lighter substances. The different degrees of permeability to the x -rays shown by different substances may be clearly seen from the

hand reproduced in *The Open Court* of February 6, where the soft parts, cartilage, bones, and the gold of the engagement-ring are distinctly recognisable by the varying darkness of the parts.

The most important of the known properties of the x -rays are, first, that they produce fluorescence, and, secondly, that they are capable of producing chemical effects, even after they have passed through opaque and dense solids on their way from the vacuum-tube. This fluorescence may be evoked in a large variety of substances, like glass, quartz, etc., but its effect is most marked and vivid in barium platinocyanide. Röntgen had wrapped black paper round his vacuum-tube, and made the room totally dark. A paper screen painted with barium platinocyanide then glowed brilliantly whenever a discharge was passed through the darkened vacuum-tube.

We have made use of this property here in the Hamburg State-Laboratory in order to ascertain quickly whether a tube was sufficiently exhausted to emit the x -rays. For this purpose a blackened cylinder was used, to the end of which a crystal of barium platinocyanide had been attached. This cylinder was held before the eye, and the vacuum-tube observed through the blackened cylinder. On the making of the discharge, every time the crystal glowed the x -rays could be successfully employed for photographic purposes, but whenever the glow was imperceptible, the vacuum-tube was unfit for this use.

" X -spectacles" is the name the author has given to a little apparatus made of two such tubes, furnished with suitable fastenings behind the ears, and designed for both eyes. Paper coated with barium platinocyanide may also be used in place of the crystal. Equipped with a pair of x -spectacles, a man can tell by the relative intensities of the fluorescent spots whether the x -rays impinging on these spots have passed through much or little substance, and, under favorable circumstances, by this means we may detect the shape of dense objects enclosed in small, light boxes. For example, if we hold a little paper box made to contain a ring between the vacuum-tube and the x -spectacles, we can tell whether the box is empty or whether the ring is in it. Important improvements will be made

in the x -spectacles when scientists shall succeed in constructing chemically prepared plates which are as perfect as those at present in use in photography, but which shall differ from them in being totally insensitive to common light, while at the same time capable of receiving the impressions of the x -rays. A plate of this kind will be better than paper coated with barium platinocyanide, for the reason that the chemical changes evoked on the plate by the varying intensities of the incident x -rays would cause the object to stand out in far sharper relief than would the transient action of fluorescence. But there would be this drawback attending the operations of a man whose eyes were equipped with such an improved pair of x -spectacles, that he would have to insert new spectacle-glasses for every new object seen.

In the possibility last set forth we have mentioned the second of the two properties which have drawn the attention of the civilised world to the x -rays. The first of these two properties was that the rays penetrated all substances, though in varying degrees. The second is their power of producing chemical effects on photographic plates. By the intensity of their chemical effects on such plates the x -rays indicate the relative amount of substance they have passed through, and for this reason the description "photography of the invisible" has been justly applied to the new discovery. Even though a body be totally opaque, yet the molecular composition of its interior can be disclosed by the chemical action of the x -rays, especially if the vacuum-tube be brought to bear upon it from all sides. So far, only the common photographic plates have been generally employed for receiving the impressions of the x -rays. But it is quite unlikely that these plates are the best fitted for this purpose. It is a duty devolving on chemists and photographers, therefore, to discover experimentally the substances which are most sensitive to the x -rays, so that plates can be constructed which are better adapted than the common photographic plates for revealing the interior solid constitutions of bodies.

As the x -rays differ from the common light-rays by being incapable of regular reflexion and refraction and by suffering greater or less relative absorption, their effects on chemically prepared

plates and the employment of these effects for the manufacture of pictures cannot be called photography, or *light-drawing*. We might, perhaps, since their discoverer Röntgen has preferred the expression *x-rays*, say *x-ography* instead of photography, and this word has been actually used. Other physicists have formed the words *actinography* and *actinogram* from *ἀκτίς* (gen. *ἀκτίως*), the Greek word for ray,—compounds which are not objectionable and which we shall use in the following.

We have referred to the construction of plates highly sensitive to the impressions of the *x-rays* as a technical problem of supreme importance provided actinography is ever to realise the expectations which physicians are already cherishing with regard to it. But we have to look upon the construction of suitable vacuum-tubes as a task of no less practical importance. The majority of tubes, even when purchased for Crookes's tubes, turn out to be useless. The members of the Hamburg State-Laboratory originally had the glass of their tubes made to order but undertook themselves the rarefaction of the air, which latter they accomplished by means of good mercury air-pumps. In this way a rarefaction of approximately one-millionth of the density of our atmosphere has been obtained.

But even the tubes thus constructed were not always fit for use. A few weeks ago tubes were received from the present proprietors of the firm of Geissler in Bonn, which were guaranteed to be adequately exhausted. On their arrival they at first proved to be unfit for use, but after they had remained lying several weeks, strange to say, they were found serviceable. A large number of the actinograms made in the Hamburg State-Laboratory have been produced by a tube which was permanently connected with a mercury air-pump. Whenever the tube ceased to work,—a condition readily discovered by means of the *x-spectacles*,—the pumping was continued till it reacquired its original power, usually after the lapse of a brief space of time.

In the last few days (Feb. 25) another important advance in this direction has been made in the Hamburg State-Laboratory. By the use of a newly patented mercury air-pump just obtained from Berlin, and automatically working by the suction of water, and sec-

only by the application of a method for removing the particles of matter that adhere to the inner walls of the tube and which at low pressures are readily transformed into gas, tubes have been constructed and are there in use since Friday, the 21st of February, which yield actinographic results far superior to anything obtained by the old tubes. Also the last tubes which have just recently been received from the firm of Geissler in Bonn are incomparably better than their first ones.

Three actinograms taken by the new improved tubes are particularly worthy of notice: (1) the actinogram of a plaice which has swallowed shells (its reproduction will be found accompanying this article); (2) an actinogram of an aborted human foetus twelve to thirteen weeks old (unpublished); (3) the actinogram of a lady's hand into which a needle had been run a short time previously, and of which there was no outward trace (also accompanying this article). In the last case the surgeon who had brought the lady to the Laboratory removed the needle after a mere glance at the negative. The photograph of the needle was then placed side by side with the actinogram.

Further, the actinograms taken by the new tubes differ from the old ones not only in distinctness but also in the time of exposure required. With the new tubes the interior of the hand was taken as distinctly in five minutes as it had been with the old tubes in twenty minutes. The attempt will be made in a few days to actinograph the whole human body. It is to be sincerely hoped that these experiments will be successful, although of course the time of exposure will be considerably longer.

The merit of having successfully repeated Röntgen's experiments as early as the middle of January, and of having obtained unusually good negative actinograms at about that time, belongs to Professor Voller, the Director of the Hamburg Physical Laboratory. Dr. Voller also drew attention to the fact that vacuum-tubes in which induction-discharges are taking place *grow hot when they emit no x-rays*, that is, are unfit for actinographic purposes, *but remain cold when they do emit x-rays*, that is, are fit for actinographic service. This fact is important as showing that the x-rays constitute a new

form of energy into which the electric energy appearing in the vacuum-tubes can be transformed. When this electric energy is transformed into heat, it can then not be re-transformed into the new *x*-energy, and *vice versa*.

It will be seen, thus, that the Röntgen rays fall within the scope of the law of the conservation of energy, agreeably to which work can never be produced unless an equivalent quantity of work, be it in another form or not, has been expended, and conversely, work can never disappear without an equivalent quantity of work appearing in some other form. This great law is the monistic principle which embraces all physical forces, and also the newly discovered force.

HERMANN SCHUBERT.

HAMBURG, GERMANY.

THE PHILOSOPHY OF MONEY.

IT HAS been suggested to me to write an article upon the philosophy of money. I do not feel competent to do this work as it ought to be done, but it is possible that I may be able to deal with the subject so as to make the elements plainer than they now are to plain people, leaving to others who have more time for study and reflexion to review the subject from the standpoint of the scholar and the student. I can only deal with monetary science on the basis of experience derived from more than fifty years' practice in the active pursuits of business life. I shall try to illustrate my thesis by such illustrations as I have been able to derive from somewhat desultory reading, undertaken from time to time with a view to testing a judgment already formed from experience, rather than with a view to forming a judgment on a historic basis.

It is very seldom that the faculty of observation and the opportunity for it are coupled with an academic mastery of the processes of thought, among those who deal with economic questions. The name of Adam Smith will occur to every student's mind as an exemplar of this combination. For that reason his work has justified what was said of it soon after its publication,—that "it would convince one generation and govern the next." Had that book been published one generation earlier it is not probable that the economic blunders would have been made by which the English government forced the colonies of America into a war of separation.

The fault in a very great part of the present discussion of monetary science is due to the almost exclusively academic and *a priori* treatment of pending questions by many conspicuous writers who are without practical experience, on the one side,—and the dog-

matic persistence of many so-called practical men who are without the training of the university or the college, on the other. Hence it follows that the safest guides in directing legislation in recent years have been found among men who, without claiming to be either students or masters of monetary science, have had a sound legal training and have therefore become capable of weighing evidence, reviewing both sides of the case, sifting out fallacies, and reaching the true point of the whole discussion.

It is not without reason that the ablest men who have been charged with executive and administrative power in this country, and in almost all others, have been members of the legal profession. When preparation for the practice of law is accompanied by judicial qualities of mind, the true dignity of the science of law becomes manifest. We have lately owed the financial safety, the honor, and the credit of this nation to one of the most conspicuous exemplars of this rule.

I may be unable to cite all the authorities from whom I have derived most valuable information, fully sustaining, in my own belief, the conceptions or hypotheses which had been developed in my own business experience. One who reads without keeping any record of citations or authority from standard works is often unable to discriminate or to separate the conceptions which he has derived from his own experience from those which have been derived from books, or to measure the relative influence of either upon his own processes of reasoning.

In my effort to establish a true monetary theory from the conditions of the present by justifying it on the basis of the facts which have governed events in the far-distant past, I have been led to accept what may be called the theory of an empirical development of money, of weights, and of measures, as distinguished from the theory, especially of weights and measures, which is based on an assumed mastery by the ancients of the laws of astronomy and mathematics, thereby enabling those by whom weights and measures were first invented to give them a scientific basis. In order to justify this conclusion, regard may be given to certain present conditions connecting them with prehistoric periods. Weights, meas-

ures, and money are now in use among barbarous races who have no conception of science.

May it not be held that whatever form of society, method of distribution, monetary system, or process of what is called manufacturing, has ever existed upon the globe, corresponding conditions or similar practices now survive in some part of its area? Even the mythical conditions of the Garden of Eden, wherein people dwelt without need of working for their subsistence; where one needed not to take thought for the morrow, what he should eat, or what he should drink, or wherewithal should he be clothed, are still to be found on some of the islands of the south seas,—Adam and Eve, Cain and Abel, and the whole tribe or their types, are there, existing under conditions in which they have not been elevated to any conception of true manhood and womanhood by the necessity of labor.

Again, one may find the natural conditions and processes of the Stone Age in Patagonia, in Alaska, and in some other remote parts of the world, where men still manufacture and use flint implements and make their dug-out canoes with stone chisels.

Again, there are very many parts of the world where the inhabitants are clothed in fabrics, of which the thread is spun upon the prehistoric distaff, and the cloth is woven upon the hand-loom, corresponding identically with those of which we have the pictured record in Egypt, in Assyria, and elsewhere.

Lastly, there are said to be parts of Africa in which the prehistoric monetary unit, the cow, is still the measure of value and the store of wealth, under social and monetary conditions and methods of trade corresponding to the conditions of the ancient world of which we have knowledge: of Asia Minor, of Northern and Southern Europe, and even of the then remote Ireland, when in the early ages, at the dawn of history, domestic animals, including slaves, passed current in exchange, serving all the purposes of money. The cow was then the unit with which all other types constituting the "pecunia," or moneys, of the then known world were rated; that world being one of organised society, of art, of literature, and of an extensive commerce by land and sea.

May we not trace the development of our monetary systems from these conditions, of which we have faint and fainter records in the far distant past? Are we not even now almost under the necessity of correcting many popular conceptions of money and of monetary legislation by dealing with the conditions which first brought money into use? That is my idea of what a true philosophy of money should be. I can only regret my own inability to develop and state the terms of such a philosophy for lack of that thorough training which men who are forced to begin the work of getting a living very early in life are apt to miss.

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So far as we can know anything of the condition of primitive man there may have been a period when not even barter existed, as there are now human beings of some of the lowest types who seem to have no conception of mutual service; but even in the nomad or pastoral period an exchange of products or services was established and at that time domestic animals, notably the cow, had become the medium of exchange, serving the purpose of the instrument which we call money before the metals had come into monetary use and long before coinage had been invented. It is noticeable that art in its most refined sense had been developed before coinage existed, because the earliest examples of coins are examples of most artistic work. It is well proved that the earliest coins were made of gold and were equated with the cow and the ox, whose images they bear. Both gold and copper appear to have been precious or monetary metals before silver, because they were found in the condition of pure or native metal, while silver waited until the art of smelting had been learned.

Yet the monetary use of metal was not limited to these three. In many places iron became money and bronze or alloy was very widely used. In every instance and in each separate development of a monetary unit or medium of exchange, that substance—whether metal, shell, or some article of consumption—was adopted as money which was universally most valued or esteemed either for ornament or for use. In other words, without process of law, rule, or statute

in the modern sense, the people of every land have adopted some article of greatest valuation or esteem as their standard or unit of value, i. e., some article universally desired which could be passed from hand to hand in the conduct of trade; after coinage was invented subsequently adding subsidiary coins for convenient use in lesser transactions, but never departing from the single standard or unit until the decrees of rulers or statute laws began to be applied in order to force a substance of lesser esteem or valuation into monetary use as a substitute for the unit of the highest valuation. Hence my reflexions led me to the hypothesis that the first conception of a decree or act of legal tender, enforcing the acceptance of one of two or more kinds of money at the choice of a debtor while depriving the creditor of any option, must have been born in fraud and nursed in corruption.

Good money—that is to say, coin which is worth as much after it is melted as it purports to be worth in the coin—requires no act of legal tender to enforce its use or acceptance. Bad money, which is not worth as much in bullion as it purports to be worth in coin, can only be passed by force. The very fact that a coin or its substitute promise of a coin can only be kept in circulation or in use as money by the force of an act of legal tender proves that the coin or its substitute promise is bad money.

As the subject is developed it will become apparent that money existed and was used as an instrument of exchange before coinage had been invented; in the subsequent period coined money was used and did all the work of money before any act of legal tender or any legislative regulation regarding money had been conceived.

In order to comprehend the genesis of money one may deal with the various types and substances which have been adopted in various countries and among races which could have had no recourse to each other or to science in determining the choice of the material. Money has had its beginning in a common necessity coincident with the practice of commerce. So far as the facts can be traced, an exchange of products or services has been gradually evolved by almost every race of men, beginning with barter but soon developing the necessity for and the use of money. In each in-

stance the substance chosen has been the one most highly esteemed at that time and in that place, either for personal decoration or use. This will become manifest upon a recital of the different kinds of money of which the types are known. A most complete record may be found in *The Origin of Metallic Currency and Weight Standards*, W. A. Ridgeway, Cambridge, England, 1892, to which I have added a few examples from our own history. A summary of the different kinds of money, their past and present use, may illustrate the point which I have stated.

It is held that when man first learned to tame animals and changed from the nomadic to the pastoral stage, the cow or ox became the unit of value and the medium of exchange. In the Homeric record the cow and ox are constantly named as standards of valuation; they are equated with the talent, a measure of weight applied in Homer only to a given weight of gold. In the process of development the gold washed from the rivers of Asia and Europe was made into strings of small nuggets and the dust was enclosed in the quills of birds. Weighing by balance against seeds of barley or some other cereal was invented and applied to determining the quantity of gold then held to be equivalent to a cow or ox. Subsequently came new standards of coin estimated by weight,—the Stater, the Daric, the Shekel, the Bezant or Byzant. Lastly, about 700 B. C., came the invention of coinage, the coin of gold equivalent to one cow being stamped with the image of the cow or ox and containing one hundred and thirty to one hundred and thirty-five grains of gold. Other stamps were used, and there are traces of coinage of an earlier period bearing the stamp of the cow or ox. Whoever ventures into this field must be prepared for a contest with the numismatists. I can only say that in that contest, it seems to me, those who take the side of natural selection and of a derivation or rating of the coins to the previous standard have the best of the argument.

Herein we have the origin of historic money, but the necessity for a medium of exchange or unit of value was not limited to the historic world. The ancient money of China was a bronze or brass knife with a round flat handle with a square hole in the centre; the

copper cash of China of the present day, which is the only coin of China being a survival of the knife without the blade.

In many parts of the world—in Africa, East Indies, and North America—shells of various types were adopted.

Among the Samoyades of Northern Europe the reindeer is the unit of value.

In the earlier days of Virginia a given weight of tobacco was the standard.

In Iceland, stock-fish.

Among the Aztecs, gold and cacao seeds.

In some parts of Africa, iron hoes with socket for the handle, or round plates of iron made so as to be convertible into two hoes of a given size.

Among the Ostiaks of Asia, the skins of the Siberian squirrel.

Upon the Northwest coast of America, when trade was first opened, marten skins.

In Massachusetts Colony, in early times, bullets of lead served, which were of limited legal tender up to twelve.

In fact, whenever and wherever commerce has become established, the necessity for a common medium of exchange or unit of value has led to the selection of some available commodity of common desire either for ornament or for use, first passing by tale or count, later by weight.

With the successive steps in the progress and organisation of society the metals considered precious, first gold and copper of native purity, then silver and iron after the art of smelting had been discovered, displaced the more primitive forms of money—next iron was eliminated; copper was relegated to token or conventional money, and the two metals gold and silver held the sole title of precious. Silver still retains its place as the unit of value among the poorer nations, where the common transactions are very small and where the standard of living is very low. Early in the present century gold became the sole standard of the great commerce of the world, and the unit of value of the great commercial or machine-using nations of the world is of necessity becoming adjusted to that standard.

Having thus submitted a concise statement of what appears to be the origin and development of money, we are now led to the question of the origin of legal tender or the application of the force of law to the circulation of money.

My first hypothesis was this: When money consisted of a fixed weight of metal, could any one have conceived any reason for an act of legal tender, or forced acceptance of such money? A tender may be made of any article in liquidation or fulfilment of any agreement either for money or for goods. If that tender is consistent with the previous agreement, no force is required to assure its acceptance. If, however, goods tendered are not apparently of the quality agreed upon, the tender may be refused, and the buyer may then enforce his agreement upon the seller to deliver what he had agreed to. If, on the other hand, goods which are of the quality named in the bargain are refused, the seller may enforce their acceptance at law and may recover their value in money, perhaps with damages on account of delay. But the conception of legal tender in its application to money has in modern times invariably been to force upon a creditor money of a different kind from that which had been agreed to be paid by the debtor.

There may have been a reason for legal-tender acts in the early history of coinage a little different from this. Coinage was not then the sole attribute of governments. Private coinage as well as public coinage existed. Coins of the same name and therefore of the same nominal value varied greatly in the weight of metal. The people had no means of discriminating and they were defrauded. Under such conditions an act of legal tender may have had a very true purpose, to-wit, establishing a standard coin of true weight and compelling all persons to liquidate all debts, bargains, or agreements in coin of that standard or in its equivalent, ascertained by weighing all the various coins in circulation.

The first record of an act or decree of legal tender appears to be in the time of Solon. It is held by some students that his action was governed by the latter motive, namely, the establishment of a true standard and the equation of all kinds of money at that standard. But, on the other hand, it appears that Solon did in fact de-

base the coinage of the Grecian drachma by twenty-seven per cent., thereby relieving farmers whose land was under mortgage with penalty of slavery in case of default of payment, from a part of the danger of their position. In other words, he decreed a partial settlement of farm-debts in bankruptcy. From that date to the present, so far as one can learn from the rather obscure records of monetary history, nearly if not quite all acts or decrees of legal tender have been put in force for one of two purposes. First, in order to defraud great masses of people of a part of their dues; second, in order to collect a forced loan from the great body of the people, even without their knowledge that they were being taxed in a very unjust and unequal manner.

The purpose of the legal-tender acts of 1862 and 1863 was to collect a forced loan for the conduct of the war; justifiable, if at all, as a war-measure. The purpose of the legal-tender act of 1878, known as the Bland Silver Act, and of the legal-tender act of 1890, known as the Sherman Silver Act, was to collect a forced loan for the purchase of silver bullion, to the great injury of the mass of the people and to the sole benefit of the owners of silver-mines. These acts are condemned alike on every principle of justice, of public law, and of political economy. Their evil effect has been lately impressed upon the country by disaster and by a paralysis of industry and of constructive enterprise, accompanied by the compulsory idleness of great numbers of people in the midst of an abundance of everything that makes for welfare and prosperity.

A perfectly suitable purpose of legal-tender acts, not affecting the general question, consists in the provisions for maintaining the circulation of subsidiary coinage or small change. Such enactments are very modern, but I cannot give the exact dates of their origin. Under their provisions, coins of small denomination, of silver, copper, nickel, and alloys, which are not of full value, are maintained in circulation by provisions enforcing their acceptance for very small sums, coupled invariably with other provisions for their redemption in round sums in the standard unit of value of the nation or state in which they are circulated.

The necessity for such acts of limited legal tender in respect to

subsidiary coins was developed on the failure of efforts to make all coins of silver and gold of various denominations circulate at a legal ratio when the market ratio of the bullion was not the same.

It now seems to be very plain that nations are reaching the end of the efforts which have been made during the last five centuries or more to promote the circulation of gold and silver coins of full legal tender at a fixed ratio under what is called the bimetallic system, such efforts having invariably failed.

It is very difficult for busy men who have but little time for the systematic study of history to trace the influence of commerce and the development of money, presently supplemented by the modern expansion of credit. Masses of people have as yet only a partial comprehension of the truth that the people of the world are interdependent, and that by way of trade and commerce, all who join in it, whether men in their individual capacity or men organised into states or nations, serve each other's needs and supply each other's wants to the end that all are benefited alike. There are excellent books upon the development of the commerce and of the fiscal legislation of separate countries; there are chapters in various histories, otherwise dealing mainly with military and political events, which throw light upon the potent influence of commerce and industry throughout all time; but as yet the true history of commerce and the development of the idea of mutual service remains to be brought into one standard work, capable of being easily comprehended by every-day people.

A very active discussion of the monetary question in recent years has led to several works being placed at the service of the public, from which I have been able to formulate this treatise upon the philosophy of money, hoping that one more competent will take up the same line, developing into a full history the ideas which I am only capable of presenting in a very insufficient manner. I can only give the reflex of my own observations and reading.

One can readily picture in his imagination the very beginning of trade,—the time when men first ceased to prey upon each other, presently organising into tribes for mutual support, each tribe seeking to subdue the other. Next we can imagine the time when it

occurred to some one that a man could be put to better use as a slave than to kill him after he had been captured. Presently we can imagine the organisation of the State, and as we approach historic periods we witness the organisation of nations under kings, dukes, or leaders, emperors and the like,—the mass of the people yet incapable of self-government placing themselves under the domination of the man of power in affairs and of energy, to the end that each might serve the other. Hence the establishment by almost all European States and nations of governments by privilege, rulers granting rights to the common people. That system is now culminating in universal militarism, as impossible of being sustained many years longer as it is incapable of being removed without probable revolution or in any event fearful social disorder.

From the early beginning of an exchange of services one derives an idea of the necessity of the invention of money,—of its development somewhat on the lines which I have so faintly pictured,—of the gradual survival of the most suitable substances for monetary purposes; the whole course passing from simple beginnings through to the utmost complexity, now again verging toward simplicity on a scientific basis.

It will be remarked that gold was the first metallic unit of value. It held pre-eminence for many hundred years before and after the date of the first system of coinage which was 700 B. C., down to the beginning of the Dark or Middle Ages. Throughout the Dark or Middle Ages monetary history appears to be almost a blank. It is evident that gold disappeared from use. During the great Renaissance and the revival of commerce on a broad scale by the Italian republics the necessity for a better and more uniform standard than silver and copper asserted itself. Gold coinage was resumed,—first by Florence, subsequently by other Italian republics; from that new point of departure the coinage of gold spread over Europe.

At the period of the great commercial supremacy of the Netherlands all kinds of money were brought into Holland. They were there rated by weight and their relative value was published very frequently in a series of official documents named *platkaats*. Hence

it followed that Holland kept itself free for a long period of all the difficulties which afflicted other countries in the futile attempt to keep gold and silver at a parity at a fixed or legal ratio.

It would be impossible in the limits of this article to picture this long and weary struggle to establish value by law. One reading of the effects of the alternate drain of gold or of silver from one country to the other and of the social disturbances which were caused by these changes—coupled with frequent acts of legal tender for the debasement of coin—cannot help wondering whether one of the most potent causes of war and of rebellion may not have been overlooked. It was perhaps even more potent than the effort to establish religion by law.

Presently England attained supremacy in international commerce through the possession of the paramount control of coal, iron, and steel. As her commerce developed, the evil effect of the effort to maintain the double or alternate standard of silver and gold was disclosed to the end that in 1817 England became a mono-metallic country, establishing a unit of value under the name of "pound sterling," under which name a title passes to 113.0016 grains of pure gold.

There is no lawful coin of Great Britain named a "pound." The coin which is the equivalent of a pound sterling when of full weight is named a sovereign. There is a five-pound (not pounds) coin and a two-pound coin authorised by law, but they are not of general circulation.

Gradually but surely the unit of value under the name or title of "pound sterling" has become the standard of international commerce. It will be observed that international commerce is free of the interference of acts of legal tender. Drafts drawn or obligations incurred under the title or name of pounds sterling can only be satisfied by payment in so many multiples of 113.0016 grains of pure gold; otherwise bankruptcy ensues. It is through the stability and safety of this unit of value that London has become the banking centre of the world and that England dominates the commerce of the world.

This country undertook to keep gold and silver coin of full

legal tender at a fixed ratio in joint circulation from the date of the establishment of the mint and the enactment of the first acts of coinage and legal tender down, as I recall by memory, to the year 1835. That effort failed with us as it has failed everywhere.

The act diminishing the weight of subsidiary silver coins and limiting their tender practically put this country on the single standard or unit of gold. This fact was recognised in the act of 1873 by which the gold dollar weighing twenty-five and eight-tenths grains, nine-tenths fine, is declared to be the unit of value of this country.

The difficulties and disasters ensuing from the effort to maintain the legal parity of gold and silver in spite of the varying market value of the bullion brought all Europe to the discussion of this question many years since. Beginning with Germany in 1871, all European nations have, I believe, without exception been forced to adopt the single standard on a gold basis.

Under the acts of 1878 and 1890 this country has made another futile attempt to keep gold and silver at a parity by legislation. A forced loan to the amount of about five hundred million dollars has been collected in order to sustain that effort, all of which has been or must be paid from the public revenue derived from taxation except that part which may ultimately be discharged by the disposal of the silver purchased at whatever its market value may be.

The effort has lately been made under the name of Bimetallism to secure by treaty an international legal tender, under which the people of one state or nation might force the acceptance upon their creditors of money made either of gold or of silver while the creditor nation may be deprived of any choice in the matter. That undertaking has not met with any general approval and is evidently dying out.

The study of the history and philosophy of money leads to a conclusion which may be summed up in a few words. There is and can be no absolute standard of value because the valuation or estimation of each subject and of each instrument of commerce rests upon the determination of each individual and of each commercial community. Duality in a unit is unthinkable. It is necessary that there should be a unit of value possessing the greatest stability and

uniformity that is possible under the varying conditions of the world. By process of natural selection the metal gold is established as that unit, and to that condition all commercial nations must of necessity adjust their own financial systems. These conditions, which can be traced from a period before there was any conception of statute law in the modern sense, before any metal had been put to monetary use, before coinage had been invented, before banks had been established, and before credit had become a prime factor in the conduct of commerce, have been developed from time to time, holding their sway in spite of adverse legislation, decrees, and treaties, and not by means of them. Those nations, notably the Italian republics in their early days when the Bank of Venice was first established, the Dutch Republic, and lastly the English nation, who have first recognised the force of these conditions and their controlling influence, and have adapted their monetary systems to them, have held the paramount position in commerce, manufacturing, and industry, as compared to all others.

Portentous changes are now in progress. The dominion and paramount control of the deposits of coal and iron have passed over from Europe to this country. The influence of that fact may not yet be comprehended, and our progress may for a time be retarded by uncertainty as to what our unit of value is to be ; but when the unit of value of this nation is established on as sure a basis as it will be when the dollar made of gold is the single standard and only money of full legal tender, the power of this country to carry the abundance which may be brought forth under a system of government whose motive is peace, order, and industry, will place the people of this country in the very fore-front of those who may serve the needs of the world under the beneficent influence of commerce.

EDWARD ATKINSON.

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IN SEARCH OF TRUE BEINGS.

IF I MEET a philosopher for the first time and wish to learn at once what kind of a philosopher he is, I ask him frankly: What do you think really exists? If he answers sincerely, he can give only one of two answers. At least, I have met only two answers to this question worth mentioning. The *individualist* says: "I do most really exist, and besides me other beings like myself." The *universalist* answers: "Only the *whole* does really exist, and I am but a manifestation of being." The universalist is the most diversified species of the two. He appears as an idealist in Plato and Hegel, as a materialist in Democritus and Epicurus, as a pantheist in Spinoza, as a pessimist in Schopenhauer, as a socialist in the modern society. He feels himself always dependent on something else, on ideas, atoms, God, society; he never admits that he is himself a true independent being. In politics he advocates the omnipotence of the State, in economics the monopoly of production, in religion obedience to general laws fixed once forever, obliging every individual to give up his individuality; in psychology he denies free will, and if he chooses to be consistent he never admits personal immortality. This universalism is so strong by its secular tradition that individualism has frequently lost its best advocates through universalist suggestion.

Descartes, who began with individualism, ended in acknowledging a "*concursum Dei*" in each act of our soul. Leibnitz also could not get over the difficulty of interaction without *harmonie pré-établie*. The whole history of philosophy is full of such contradictions between the individual's independence and God's omnipotence. Then there are radical individualists, who bring individualism

into discredit by staining it with boundless egoism, as for instance *Nietzsche*, who thought his own true existence incompatible with the existence of others, and is gone mad in the struggle for infinite self-assertion.

There is one nation on earth which has given a very strong expression to individualism and to the recognition of the rights of a minority. The Poles, while they were independent, thought that if a law was not unanimously accepted by all, if it seemed wrong only to one of them, it ought not to be recognised as law in a free nation. According to this conception of freedom they framed a constitution unique in history, in which the veto of each member of Parliament was alone sufficient for suspending indefinitely the decisions of all the others. Unanimity was the condition of every decision which was to be obligatory for all. This strange and elsewhere unknown recognition of a minority of one, led Poland to anarchy and to the loss of political independence, but it remains for the whole of mankind an ideal realisation of individualism.

This explains why individualism nowhere found more typical representatives than among the Poles. The Polish poet Mickiewicz says in one of his greatest works to the Christian God:

"My strength came thence, whence thou hast taken thine, nor do I fear to lose it."

How difficult it is for universalists and individualists to understand each other, I had many opportunities to see, but never so fully as when I met at the Parliament of Religions in Chicago with an overwhelming majority of universalists from all parts of the world. They asked me what was my faith, and I could not answer by some well-known name, because I had never met with an adequate expression of my Polish individualism in the works of foreign philosophers. Remembering those questions of my friends, the universalists, with whom I had infinite discussions two years ago in Chicago, I shall try now to state in a short and clear way what is the teaching of our Polish fraternity, a church without holy books or authorities, but with the strongest faith on earth.

I do not recognise any power nor any form of being above the individual, nor do I know anything about an almighty, omniscient,

perfect Being. The being I know best is myself—then other human beings.

I know also that I have the power to influence other beings, and that I am influenced sometimes by others. Some of my actions are, so far as I am conscious of, not caused by myself, and as I do not admit unconscious causation, such actions must be caused by some beings outside, if not by living men, then by invisible spirits, one of whom may be called God, if we suppose him more powerful than the others, without any necessity to recognise his omnipotence.

Such an idea of God as a being like myself is entirely different from the traditional notions of an almighty Creator. Still my true position respecting the Divinity is more a suspension of judgment than a frank denial. I have never met God, nor have I known him as a distinct personality. I leave it open whether he exists, though I am inclined to doubt about his being my Creator.

I think I cannot have been created at all, because creation implies a beginning in time, and time is only in my thoughts. True beings like myself are independent of time, because the existence of time itself is conditioned by their existence.

Time and space are within me; I could not be a true being if I were like matter in time and space. Other beings, in so far as represented by me, are phenomena, and seem to be in time and space. I can look at myself in my relation to others as to a phenomenon in time and space, but for myself I am a real substance, outside time and space.

I do not deny succession of states in myself, but succession is not the same thing as time. There is no reason why a simple state of my mind should last any length of time. No state of mind, no psychical act requires time to be completed. Only physical movements occur in time. Psychical movement goes on without friction. In less than a second I can psychically live a life; a century of human chronology may be for my mind a single thought.

My life is a succession of events, and is not determined in advance, because I recognise my *free will* as the chief factor of my acts, and I am conscious of my faculty of choice at every point of my life.

I am sure to have a perfect knowledge of my persistence after death, and I think that people who speak about immortality without feeling themselves uncreated are in contradiction with themselves. Anything that had a beginning must have an end: it is not given to an ephemeral creature to be immortal. If I feel myself immortal, it is not because some God made me such, but because if I were not immortal, I could not be a true being at all. The mere fact of my being implies my eternal being, because anything that can be destroyed, has only an apparent existence, due to something else indestructible.

As the naturalist imagines everything built of atoms and thinks those atoms to be the true components of each material appearance, a metaphysician reduces the atom itself to its true cause, the conscious monad, able to represent atoms in her mind and to frame space and time for the movements of those imagined atoms.

Many times I have discussed my existence with different adherents of universalism, materialists, idealists, pessimists, socialists, pantheists. At last I came to the conclusion that they might be right for themselves and wrong as to my existence and the existence of other true beings. They say they are only manifestations of something else: atoms, ideas, God, society, the universe. Perhaps they are such manifestations of a being unknown to me, but I know myself to be a true being, the most certain being I know of. I let them be what they pretend to be, and expect sometime to make the personal acquaintance of that mysterious being, their master. But I defy him to become my own master: I shall resist his power like Shelley's Prometheus did that of the old Jupiter, "with a calm fixed mind." I do not hate him, nay, I look at him as my friend, because we have to a great extent the same aims and also many common enemies.

The servants of that mysterious being, called God, say that they love mankind, and that they do so by his order. I love mankind, truth, beauty, not because it is God's will, but only because it is my own free pleasure. I act according to my ideas of duty, not imposed by any other being but by my own considerations of the results of my action.

I am confident, that those aims, which are the aims of my will, can become the common aims of all beings, and that makes their power.

As to the mystery of interaction between the beings, of my partial influence on others and the influence of others on me, I prefer frankly to confess that I have no explanation for it. The hypothesis of a *concursum Dei* or *harmonie préétablie* seems to me no explanation at all. It is useless to explain a common experience by some very uncommon and obscure hypothesis. The whole problem of mutual influence, as it is contained in the smallest movement of my body, remains entirely the same in the supposed action of God on men.

If Descartes or Leibnitz understood how God could create or act, I think they could understand in the same way their own action on others. But they seemed not to be quite sure of their own existence, and thought that God's existence and action was easier to understand. They were parts, manifestations, or servants of their God—I am my own Lord. I do not deny the power of their Master. He may act on millions and millions of his servants, sometimes on myself, but I know he does not *always* act on me, I *can* resist his actions if I wish. This certainly leads me to the indisputable knowledge of my true immortality—not the vague immortality of universalists, but a living immortality,¹ a true eternal continuation of myself, with everything that makes up my personality: memory, affections, the same aims and increased power.

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¹On the subject of immortality see my article in the April number, 1895, of *The International Journal of Ethics*, and another in the December number, 1893 of *The Journal of Speculative Philosophy*, being the publications of a lecture held in Chicago during the World's Fair.

FROM ANIMAL TO MAN.

THERE was a time when science was content to confine herself to inorganic nature. Life was a mysterious principle unrelated to the forces of nature and therefore a field for philosophic speculation, but not for exact knowledge. But this region has already been subdued by science. Already life is correlated with other forces of nature, and biology has fairly entered the ranks of progressive sciences. And now at last the border which seemed so long to separate impassably biology from psychology has also been crossed by science in her daring march. Here at last we touch the highest phenomena, and science seems identified with philosophy in subject-matter if not in method.

My object now is to touch some points in this borderland, but only briefly and lightly in the way of suggestion. What I now say may be regarded as a continuation of the lines of thought suggested in my previous writings on the relation of man to nature and especially to the animal kingdom. In these previous writings I try to show that, without violating the analogies of nature we may conceive the spirit of man as having arisen by progressive individuation from the forces of nature. That it existed first in inorganic nature as a potentiality, in plants as a germ, in animals as an embryo, which finally came to birth in man. In this paper I wish to fix attention on this last change and show in what it consists. I wish to show what is the essential difference between the spirit of man and the *anima* or soul or intelligent principle of animals.

This question lies at the very basis of philosophy. It is the question most fundamental of Locke, Hume, and Kant, viz.: the origin of knowledge from sense-impression. It is more: it is a

question which touches the origin of all that is characteristic of man—art, language, society, morals, religion, science—and is thus closely bound up with all our dearest hopes and noblest aspirations. But under the new light now shed on every department of thought by the theory of evolution, it must be approached in a new way and investigated in a new spirit. For if this subject lies at the basis of philosophy, it is now shown also to form the very summit and crown of all science. If ever we are to have a comprehensive and rational philosophy of nature and man, science must solve this question.

In the past, man, body and spirit, has been studied too much apart from nature. Thus the anatomy, physiology, and embryology of man were separate sciences. This is no longer possible. The comparative method is the great method of discovery in all the more complex departments of science. This method has been successfully applied to all that concerns the human body. The time has come when it must also be applied to the human spirit. Anatomy did not and could not become scientific until it became comparative anatomy; physiology and embryology until they became comparative physiology and embryology; so also psychology will never become truly scientific until it becomes comparative psychology,—until the mind of man is studied in relation to those fore-shadowings and beginnings of mental phenomena, which we find in animals and in infants. This is just what psychology is waiting for to-day.

But there are two opposite dangers against which we must guard. The older thinkers saw an infinite gulf between man and animals and therefore thought lightly of the apparent likenesses. Modern science, on the contrary, recognises and rightly insists on the resemblances, but seeks to minimise the differences. Now the only rational attitude is to admit with the evolutionists the close resemblance and even genetic connexion, and with the older thinkers the enormous differences; and then try to reconcile these two very diverse facts.

Admitting then both the close resemblance and the immense difference, admitting also the genetic connexion—the one having

come out of the other by a process of evolution, I wish to show in a general way in what consists the essential difference—to put my finger as nearly as I can on the dividing line where humanity emerges out of animality.

This I know is a difficult problem. The acutest minds have striven in vain to solve it. I am not so vain as to imagine that I can do so completely. It can only be done by a profound critique combined with far wider and more accurate knowledge than we yet have of the psychical phenomena of animals and of infants. All I can hope is to contribute something, however small, towards its solution, by bringing forward an assemblage of differences each one small at first, but a germ from which something distinctive of humanity seems to grow; each one perhaps unsatisfactory by itself, but each strengthening the others, and therefore all together convincing; each in some sense similar to all the others and therefore strongly suggestive of common origin. Of these several differences, we take up first those which seem simplest, in the hope that these will furnish a key which will help us to understand the others.

I. SPEECH.

This has always and justly been regarded as one of the most important distinctive characteristics of man and some make it the one essential distinction from which all others arise. But dogs may be taught to understand human speech and parrots may be taught even to speak intelligibly. Now, what is the difference between such parrot speech, or better, between human speech as understood by a dog and the true rational speech of man? Some will doubtless say that parrot speech is mere succession of imitated idle sounds signifying nothing—associated with no idea or object in the mind of the parrot. But I am sure those who have observed closely will agree with me in thinking that in them, words and phrases are sometimes associated with objects and actions. When she says, "Polly wants a cracker," she means what she says. When she says, "Bring in breakfast," she expects food to be set on the table. Amid much idle repetition, there is certainly often a dim association of word and thing. What, then, is the difference between this and

human speech? I answer in brief: It is just the difference between sign-language and rational speech; meaning by sign-language all movements or sounds which by repeated collocation become associated with things or actions or emotions.

Sign-Language Versus Rational Speech.

All the higher animals have their cries of fear, rage, and pain, or notes of pleasure, joy, and love. Social habits, in default of notes, necessitate other and more elaborate means of communication. Ants, for example, undoubtedly exchange information by touching antennæ. The sign-language of deaf-mutes is mostly the same, although the rational human mind always puts something more into it. The alphabetical sign-language of mutes is of course of a higher order and a strictly human sort.

Now, words as well as gestures may be only signs; and speech may be only word-sign language. Words may be only the signs of things, so that by frequent collocation the word suggests the thing and the thing the word. This is the best that can be said of parrot-speech or of the speech of man as understood by the dog. Such speech does not differ except in degree from the movements of an intelligent dog who wishes to make known his wants to his master, or the sign-language of an ant who tells his fellow of a fortunate find. In this sense all animals talk. It is true that in the case of the parrot the words and phrases have been learned; but by frequent collocation of words and things the two become associated in the mind so that the words are no longer idle sounds.

But it will be asked, Is it not the same with all language? Does not the child, too, merely learn the words, and, by practice, to utter them? Does not the child, too, by frequent collocation of word and thing learn to associate them? Yes, true. All the speech of earliest childhood is nothing more than this word-sign language, this imitative parrot-speech. But true rational speech is different; and if we watch closely we can observe in the history of every child, the one kind change into the other. The process is as follows:

The child by frequent collocation learns to associate certain words with certain things, and *vice versa*, then to use the words as

signs of the things ; then a phrase (to him only a long word) to indicate a certain action. This is all parrot-speech, although far more perfect than that of any animal. But at a certain time, sooner or later, there comes something more, not only more perfect, but different ; not only a growth, but a birth. At a certain time the child perceives the power of words in *relation* to one another. This is a perception, not of a thing, but of a relation. Or if we call it a thing, not a material, sensuous thing, but an intellectual thing. He analyses phrases which before were to him only long words, and perceives the power of each part in relation to other parts. Immediately he is able thereby to make new, untaught combinations. He invents new phrases, creates original sentences. There is now for the first time a grammar in its language. There is no longer any limit now to new combinations. Some of these new combinations give rise to strange and even laughable phrases, which are repeated by the fond mother as the smart sayings of her darling.

Now just here true rational speech, characteristic of man, begins. All else follows as a necessary consequence. Words are combined into phrases, phrases into sentences, sentences into paragraphs, and paragraphs into the most complex pieces of thought-work. But all before this is mere sign-language, not differing except in degree from that of animals. Many animals, especially the dog and the monkey might be taught such language if their vocal and articulating organs were suitably formed ; but the second stage no animal can attain, for want of the mental faculties necessary.

As word-sign language, so gesture-sign language may become rational by the presence of the necessary mental faculties. Thus the sign-language of deaf-mutes may be truly rational, being informed by the rational mind.

The difference here pointed out between word-sign language and rational speech is similar to, and may be illustrated by, the difference between written and spoken language. As in rational speech, the phrase-word is analysed into its component words, and the separate powers of these components in their relation to one another is perceived ; so in written language the analysis goes one step farther, and each word is analysed into its component sounds,

and the power of each sound in relation to other component sounds is perceived. The first analysis is connected with the birth of human reason; the second with a higher stage of culture only.

I leave to others of greater acuteness to follow up the distinction here pointed out. My object now is to give a whole assemblage of similar distinctions, each one only in outline, trusting to their combined effect for the conviction I seek to produce. I wish to show that in all the faculties of the human mind as compared with the corresponding one in animals, there is a distinction similar to that already pointed out.

II. USEFUL ART.

The gradation between the constructive art of animals and the lowest art of man is very complete. It is, therefore, more difficult to draw the line sharply here. Yet a little reflexion will show where it must be drawn and that it is of the same kind as that already pointed out under the last head.

The constructive art of animals, as shown in the nest-building of birds, the dam-building of beavers, the complex galleries of ants, the hexagonal honey-cells of bees, is apparently only the final result of a succession of blind, divergent trials and survivals of best methods, continued through successive generations, and conserved in inherited brain-structure, until a really marvellous excellence is sometimes attained. The successive improvements under such blind trials and survivals seem to be wholly unconscious and unintentional, and, therefore, exactly like the improvement of the organism itself under divergent variation, struggle for life, and survival of the fittest. It is, in other words, unconscious evolution of constructive methods. This is what we call instinct, and it is in this way that the most wonderful instincts have been gradually formed. That we have rightly interpreted the significance of such art is shown by the fact that its excellence is in no wise proportional to intelligence, but rather to the fixedness of habits and the narrowness of the line along which improvement has taken place.

But the constructive art of man, even the rudest, has always another, a reflective element. In man's work there is always a dis-

tinct conscious purpose or idea which he deliberately tries to attain. Furthermore, there is always in man a perception of law: unconscious, intuitive perception it may be, i. e., perception by methods which he does not stop to analyse and could not analyse if he would—but still a dim perception of the laws of nature underlying his work. In art, as in all else, man is always inventive—creative; and even the inventive genius of a Watt or an Edison is only a higher form of that which distinguishes man, even in the lowest stages, from animals.

But here again, in art as in language, we find on the human plane two grades, and the distinction between these two grades is perhaps more easy to draw than between the human and the animal. The two grades referred to are empiric art and scientific art. Empiric art is the result of dim, unconscious, intuitive perception of law; scientific art, of the clear, conscious perception, the rational knowledge of the laws of nature. Man originates and improves art by incessant trials, not indeed wholly blind, as in animals, but guided only by the dim light of intuitive reason. By this method alone, through successive generations and perhaps aided, as in the case of animals, by inherited capacity, a high degree of excellence may be attained. But sooner or later such art is arrested and either petrifies or decays. But if under the stimulus of such art science be once awakened, then the principles underlying the work are analysed and understood, and art becomes scientific and thereby becomes endowed with a new and higher life and thenceforward indefinitely progressive. Thus in this as in all, there is for man a human life and a higher life. The one separates him from animals, the other separates him from his lower self.

III. FINE ART—MUSIC.

I suppose most persons would say that it is in music—bird-song—that we find the nearest approach to man. Who has not been charmed by these songsters of nature? Who will deny that the pleasure we thus derive is really of a very high order? But the very fact that it is of a very high order ought to make us suspect that its source is all other than is usually supposed. There is, I am con-

vinced, a profound difference between bird-song and human music, and that the pleasure we derive in the two cases has an entirely different source. I would go farther and say that, as the speech of parrots is no true rational speech, so the song of birds is no true music; it has no real æsthetic quality in it. Let me explain.

Beauty versus Sense-Agreeableness.

Sugar affects our gustative nerves agreeably, and quinine disagreeably. But no one would think to call this pure sense-pleasure beauty. So odors affect us with pleasure or pain, but no one would think of dignifying such pure sense-pleasure with the name of beauty; because these lower senses are not closely connected with the higher faculties of the mind. But in the higher senses, so close is the connexion between sense-pleasure and the higher emotions, that the two become confused in the popular mind, and, therefore, in popular language. Thus we often speak of a beautiful sound or of a beautiful color, whereas the proper word is sweet; for the pleasure derived from a pure sound or a pure color is on the same plane as that derived from sugar. It is pure sense-agreeableness, and nothing more. But take two colors, place them side by side, and compare them. Now something more and higher is at once perceived. Each color, as before, affects us agreeably (sense-pleasure), but in addition we perceive the *relation* between, whether of concord or discord. This is an intellectual perception, not a sense-perception. It is a perception of a relation, not of a thing. The effect is not on the plane of sense, but on the plane of mind. Here, then, is the simplest possible perception of beauty,—beauty reduced to the simplest terms. The harmonious combination of color with color, of form with form, and these two again with one another becoming more and more complex, and therefore higher and higher, constitute the whole art of painting.

So also is it with music, and the principle is best illustrated in this department. A simple sweet sound produces in us, not the feeling of beauty, but only a sense-pleasure. The æsthetic emotion, the so-called sense of beauty (see how hard it is to avoid the language of sense) is and must be at least one step removed from the

plane of sense. But suppose we make two sounds, either consecutively or together. Now we perceive, as before, each sound (sense-perception), but we perceive also something else which is not sense-perception. We perceive the relation between the two sounds, whether concordant or discordant. If concordant, we call it harmony, consecutive or chordal. This is beauty or æsthetic feeling reduced to its simplest terms,—the simplest elements of music as distinguished from mere sense-pleasure. These simplest harmonies are then combined into musical phrases, phrases into strains, strains into songs, and songs into the most complex choral or orchestral music. As the relation becomes more complex, the result is removed more and more from the plane of sense, becomes more and more intellectual, but also more and more difficult to appreciate without long culture.

The outcome of the whole argument is this: the simplest element of beauty is still one step above the plane of mere sense. It is an intellectual perception, not a sense-perception. It is a perception, not of a thing, but of a relation; or, if we must call it a thing, then I would say that it is the perception of an intellectual thing, not of a material thing. As art becomes higher, the perceived relations become more complex and difficult to grasp, the intellectual thing becomes more and more removed from the plane of sense.

It is easy now to see why true art is confined to the two higher senses. It is because of the great variety of the sense-impressions in these and therefore the complexity of the relations amongst these impressions. It is conceivable, however, that there may be a low kind of fine art connected with these lower senses of taste and smell. It is possible that by a skilful combination of tastes with tastes and smells with smells, and these two again with one another, the arts of cookery and perfumery may rise one step above the plane of sense. If so, we would not advise a special cultivation in the enjoyment of this art; because from the dominance of the sense-element there is danger that the intellect may be dragged down toward the plane of sense, and thus debased, instead of the senses raised toward the plane of intellect, and thus refined; which I need not say is the true end of art.

Application.

But to return and apply these principles,—I do not believe that birds either make or appreciate music in the sense above defined. I am aware that many think differently. I know that some have even attempted to set bird-music to scale. But for myself, although I have a very keen appreciation of harmony—and perhaps for that very reason—I have never been able to assure myself of any true purposive harmonic relation among the consecutive notes of bird-song. Sometimes there seems to be, and sometimes not. When there is, it seems to be accidental and unintentional. The very best that we can accord to bird-music is what we have already accorded to the constructive art of animals. It is probable that by blind divergent trials and survivals of the sensuously best or most agreeable results, continued through successive generations, not only have the notes of the birds become sweeter, but also perhaps some simple harmonic relations may have been attained; not, however, because such harmonic relations were perceived and enjoyed as relations, but because there is probably also a sensuous element, a sweet nerve-thrill in harmonic vibrations. In any case, even those who think that they perceive real music in bird-song must admit an enormous difference between it and human music. Sing it, play it on an instrument and see if we derive any pleasure at all from it. The difference is fundamental. Man creates combinations of sound purposely and indefinitely. He combines sounds into chords, chords into phrases, phrases into strains, strains into songs, and songs into choruses. Birds never reach beyond simplest phrases, and these not created but learned and repeated or else inherited, and even so only sensuously not æsthetically enjoyed.

I have often in early life and once again recently listened to what might be called choral music in birds. The red-winged black-bird and our western meadowlark, often in great numbers sing together filling the air with their "sweet jargoning." But although the effect was delicious I could not detect any real concord. It was after all only sweet jargoning. The pleasure was evidently of an

entirely different order from that derived from music ; and similar to that derived from the sounds of nature, such as the rustling of leaves or the murmuring of streams.

But the question again returns whence then the exquisite delight we derive from the song of birds? Why the ecstasy of poets over the skylark and the nightingale? And why do we, who are not poets, but love poetry, sympathise so deeply with the poets in this regard? I will try in homely fashion to explain the real source of this pleasure.

Suppose then all conditions favorable, bright spring-morning, romantic spot, deep woods, and murmuring stream. Suppose farther the ubiquitous small boy with glass-tube whistle and tumbler of water, hidden from view and trilling the joyous notes of the canary. It is easy to imagine our rapturous delight—a delight intense and pure and just in proportion to the refinement of our nature—so long as we are deceived ; but all pleasure immediately vanishes as soon as the imposture is detected. But why? If there be any real music in bird-song, we ought equally to enjoy the whistle. But, on the contrary, all that is left is some sense-pleasure of sweet sounds and perhaps some intellectual pleasure from clever imitation, but of æsthetic pleasure there is not a trace.

What is the source then of the high delight in bird-song? Some sense-pleasure of sweet notes doubtless, but what else is added, elevating, refining, ennobling this sense-pleasure? I answer, not æsthetic pleasure of music ; but sympathy with joy, with happiness, in the humblest of God's creatures. There is nothing nobler, higher, purer than this sympathy with nature in all its aspects and sounds, with murmuring streams, rustling leaves, and singing-birds. It is the sympathy of the spirit of man with the infinite spirit of nature which is the spirit of God in nature. But its noblest form is sympathy with happiness in animals ; for animal-happiness is the harmonious activity of the whole being according to its nature, and is therefore the symbol of that higher spiritual happiness which is the holiness, the blessedness, after which we all sigh. The pleasure above mere sense which we take in the songs of birds is of the same order as that we take in any exhibition of pure animal-joy ; in gam-

hols and skipping of lambs, the mad bounding of colts, and the merry laughter of children. If we call it music, then it is the grand chorus of nature in which bird-song is but one single note.

But if there are those who would object to this view, and would make bird-song a real music, thus lifting birds into the human plane in this regard, there are not wanting others who would accomplish the same result by dragging down human music, indeed everything human to the plane of the animal. Many of the materialistic school of modern philosophy insist that all music is on the plane of sense,—is naught else than successive pleasurable nerve-thrills,—and that harmony or what we call a perception of relations is but unison of nerve-thrill with nerve-thrill to form a still more delicious compound-thrill. The answer to this is plain. In consecutive harmony, the combination occurs in memory only and therefore no compound nerve-thrill is possible. Again, what shall we say of the ecstasy of deaf Beethoven while composing his exquisite symphonies. Is this nerve-thrill? Thrilling of the auditory nerve in the deaf? Is it not rather soul-thrilling?

I need hardly say that the pleasure which some animals seem to take in human music, if they take any, is of a purely sensuous kind and not at all æsthetic. It is an enjoyment of sweet sounds, not of harmonic relations; it is delicious quivering of nerves, not a thrilling of soul.

What I have said of music applies, *a fortiori*, to all other forms of fine art. Music is the simplest and most fundamental of all arts, although for that very reason most highly developed. It is not pretended that other forms are found among animals, or possible for them.

IV. THOUGHT.

Thus far we have spoken of sensible results; of characteristic manifestations of human activity in language and in art, both useful and fine. We come now to speak of the powers underlying and determining these characteristic results.

Perhaps in no department has there been so much discussion as to the relation of man to animals as in the department of thought.

What is the relation of instinct and intelligence in animals to reason and thought in man? What is the origin of rational knowledge so characteristic of man? These are among the deepest questions of philosophy. I can, of course, touch them only in the lightest way, but as I touch them from the scientific side, I hope not without addition of some new light.

First of all, to make myself intelligible, it is necessary to distinguish between instinct and intelligence in animals. And then we shall be better prepared to distinguish between animal intelligence and human intelligence or reason. It is with this latter distinction that we are chiefly concerned.

Instinct Versus Intelligence.

It is common to imagine that instinct and intelligence are two corresponding but mutually excluding endowments, the one characteristic of animals, the other of man. But nothing is more certain than that both of these coexist all along the line from the lowest animals up to man; although in varying, almost inverse proportions. In man and animals alike there is a variable and an invariable element in conduct or activity. The former belongs to intelligence, the latter to instinct. Under a previous head, in speaking of the constructive art of animals, I said that it is the result of blind divergent trials and survival of best methods integrated by inheritance through successive generations, until the integrated sum may become large and the resulting art even more perfect than the lowest art of man. Now, the integrated sum is called instinct, while the individual additions must be credited to another and more voluntary faculty which we call animal intelligence. All wise conduct or activity adapted to ends is the result of experience; but the experience is partly individual and partly ancestral or inherited. Of the whole experiential wealth, the inherited bank-account belongs to instinct, the individual acquirement to intelligence. Now it is easy to see that in proportion as the conditions of life are narrow and fixed and the habits of animals limited to certain lines, in the same proportion will such activity become fixed in habits, and such habits petrify in inherited brain-structure as instinct. Thus it is

that perfect instincts are incompatible with high degree of intelligence, and therefore that in animals instinct, in man intelligence, greatly predominates. In animals the inherited bank-account is large and the individual acquirement small ; while in man, although the bank-account is still large—much larger than usually supposed—yet the individual acquirement always predominates.¹

Animal versus Human Intelligence.

But there is a profound difference between animal intelligence and human intelligence or reason ; a difference which is shown by the tendency of the former to integration and fixation as instinct. Intelligence, whether animal or human, works always by individual experience, but the individual experience is very different in the two cases. Experience, whether in man or animals, comes by trials ; but the trials of animals are blind trials in all directions (divergent), and only by survival of the best methods is the end reached ; while those of man are directed by thought to the desired end. Thus the individual acquirements of animals are the result of blind divergent variation of conduct and the survival of the best in useful habits, which habits are again finally embodied by inheritance in instincts ; while the acquirements of man are the result of creative, purposeful thought. It may, indeed, be hard to draw sharply the line between the blindly experimenting intelligence of animals and the thoughtful intelligence of man, and all the more so because there is so much of the animal kind in man himself ; but there is undoubtedly in man a wholly characteristic element, small it may be at first, but constituting a new departure with infinite consequences. We will attempt very briefly to indicate what is the essential nature of this new element.

Perhaps it may be put in a few words thus : animals perceive objects or things only. Man perceives also the relations and properties of things abstracted from the things themselves, and thus forms conceptions or general ideas. Comparing with music : as there is a sense-pleasure (nerve-thrilling) and an intellect-pleasure

¹ See an article on "Instinct and Intelligence," *Popular Science Monthly*, for October, 1875.

(soul-thrilling), and all true music comes out of this latter, so there is a sense-perception and an intellect-perception (conception) and all rational knowledge is founded on this latter. Or, again, comparing with language: as all rational speech is founded on the perception of the power of words in relation to one another, and therefore the meaning of words expressing such relations; so rational knowledge is based on the perception of relations and properties abstracted from things, and this perception, therefore, must precede rational speech. External, actual things are the objects of sense, properties and relations which are *internal, ideal* things are the objects of thought. And this, be it observed, is only the lowest plane of thought; for the thoughts about these relations, and the relations among these thoughts, become in their turn the objects of thought.

In a word, animals perceive things only, or if in some sense relations also, only as embodied in, as belonging to, never as abstracted from, the things. Man perceives not only things, not only relations and properties embodied in things, but abstracts these from the things and considers them separately. Animals have, given them, percepts only; man in addition forms, creates concepts also. And since such concepts are not given, but created by him, there is no limit to their number and variety. They become more and more general, more and more complex, more and more abstract as we rise in the scale of reason. Now, since all knowledge is based on concepts or ideas only, it follows that what seems like knowledge in animals is instinct, and this in its turn but the inherited sum of the results of divergent purposeless trials, and never the result of abstraction or general ideas, applicable—as all general ideas are—beyond the limits of actual experience. In other words, in all true knowledge there are two elements, an external and an internal. Nature, through sense, furnishes the material; mind, by thought, shapes, lays, and cements according to a plan or idea. Now, animals are slaves of sense; there is no creative work of mind. Of the elements of knowledge they have but the one. They have materials, but no builder, and therefore no edifice of knowledge; or, if a seeming edifice, it grew—was not built.

But some will object that animals must perceive relations be-

tween themselves and external things; for how otherwise could they adapt themselves to external things? I answer: In animals there is indeed a kind of *practical awareness* of external relations, which guides their conduct more or less wisely. In men there is all this, but also something more, viz.: a clear reflective cognition of relations as relations,—of relations abstracted from the things related,—which relations thus become the objects of thought and the basis of all knowledge.

To illustrate, take, for example, number: animals distinguish one thing, two things, three things., but have no idea of number abstracted from things. Now it is from this latter alone that comes arithmetic and algebra and indeed the whole science of number. Again, space: animals perceive space occupied by objects, but have no conception of space abstracted from its contents. But geometry, trigonometry, in fact, the whole science of space comes from this latter. Again, time: animals cognise time in so far as it contains events, but not time as abstracted from contained events, yet the whole science of time or history, even history of our own lives, comes out of this latter.

V. IMAGINATION.

I think, from the preceding, we may assert that animals only re-present in the mind as images what had already been presented to it in experience. In them there is therefore only reproduction of experiences. There cannot be in them therefore a real, i. e., creative imagination. It is true, man too is limited to experience for the materials out of which he makes pictures by the imagination, but only for the materials. These materials he combines in an infinite variety of ways and thus composes pictures which may never have existed in his own or in any other experience. No such creation of pictures, by new and original combinations, it is believed ever occurs in animals.

But it will be objected, Do not animals—dogs, for example—dream and are not dreams pure creations of the imagination? I answer, though we cannot enter into their consciousness, yet we may be sure that nothing appears in their dreams which has not al-

ready appeared in their experience. In their dreams they only go over again the exciting incidents of the chase previously enjoyed. The dreams of man, on the contrary, although they too are compounded out of materials furnished by experience, yet these materials are united in an infinite variety of ways so as to form new and often improbable combinations—are woven into strange and fantastic patterns. Human imagination is literally creative always. The power of making new combinations, of creating pictures, by the imagination, whether waking or sleeping, is essentially characteristic of man; the power of doing so with beautiful results is characteristic of genius. If the creative imagination even in its lowest form be characteristic of man, how much more must the higher form, and its beautiful result—fine art—be characteristic of him.

Reveries are but day-dreams. In a waking state we also exercise the creative imagination in constructing fantastic, improbable pictures; only in this case we do not mistake them for objective realities as we do in dreams. We build castles in the air both waking and dreaming, but in the former case we recognise their unsubstantiality. Now if we are right in what precedes, then reveries also are characteristic of man. But if reverie then also hope, and if hope then also memory, is characteristic of man. Animals live only in the present, man also in the past and future. If it be objected that animals profit by experience and therefore must have memory, I answer: so do they provide for the future and yet they obviously have no idea of the future. Provision for the future is in them only conduct without definite purpose continued from generation to generation, because the result is good and therefore in the struggle for life prevails over other conduct—a mere survival of the fittest conduct. Even so I believe memory in them is apparent, not real. They profit by experience; yet I suppose such experience does not seem to them as localised in the past but as present, as in their dreams. The re-presentation of a past experience is to them like a present reality, only less vivid. As they have no idea of time as abstracted from events, they cannot have any idea of a history of self.

VI. CONSCIOUSNESS AND SELF-CONSCIOUSNESS.

External objects affect the sense-organs. The impression is carried as a vibratory thrill or else as a propagated chemical change along the sensory fibres to the nerve-centre and determines there certain physical changes which in turn determine—how we know not—changes in consciousness which we call sensations, perceptions, images, etc. Immediately there is set up a return series of changes, viz.: change in consciousness which we call will, corresponding change in nerve-centre, propagated change along the motor-fibres, contraction of a muscle, movement of a limb, and changes in the external world. Thus through the nerve-system, with its receptive organs, the senses, and its executive organs, the muscles, is established action and reaction between an outer and an inner world. In animals this is absolutely all. But in man there is something more. The sensations, perceptions, images thus produced, become themselves the objects of perception and thought (reflexion), and still more, the mysterious self in which these phenomena inhere becomes itself the object of consciousness and thought (self-consciousness). Thus there is a consciousness, the objects of which are the facts of the outer world, and there is an inner consciousness the objects of which are the facts of consciousness. There is consciousness and a consciousness of consciousness, or consciousness in the second degree. There is a sanctuary and an inner sanctuary of consciousness. Now it is this higher, inner consciousness, this consciousness in the second degree, this consciousness of self, which is the characteristic of man. In the history of every child there is a time when self-consciousness emerges, or is born, out of the mere animal consciousness. At that moment it seems to me, the child rises out of the animal into the human plane.

I remember with great distinctness the time when consciousness of self first became clearly present to my mind, and the sense of mystery, the wonder, the awe it produced. I well remember the difficulty of imagining that others too felt, as I did, this infinite mystery of selfhood. With this undoubtedly comes the sense of

personal identity and therefore of continuous personal history and therefore also of true memory. Paradoxical as it may seem, I do not believe that animals have what we know as memory. Images of previous experiences are reproduced in their minds and determine appropriate actions, but the idea of personal identity and therefore of these experiences as belonging to a self, existing at a previous time, I believe is not possible; and without a sense of continuous history there can be no true memory. The proof of this is I think to be found in observation of the phenomena of infants taken in connexion with our own remembered history. There can be no doubt, as shown by Preyer,¹ that a child one year old is already advanced far above the level of any animal. And yet such a child has, I think, no consciousness of a self, no sense of a continuous history, no true memory of experiences as belonging to a self, and therefore no future or past, no memory or hopes. All this, according to my own experience and observation, comes between two and three years of age and therefore at a time when the child is already raised far above the level of any animal. If our view is correct, this is the reason why our own remembered history extends back only to about this age. It extends only over the period of self-conscious, rational, personal existence.²

If the childhood of the race be anything like that of the individual, we can easily imagine the sense of wonder and mystery produced by the newly-awakened recognition of selfhood. This accounts for the active, fantastic, but often beautiful, play of the imagination amongst early peoples.

All that is distinctive of man comes out of this consciousness of self. We have already shown how all science, all rational knowledge grows out of the power of abstraction. Now, the idea of self is an abstraction from the facts of consciousness. Moreover, it is

¹ *Die Seele des Kindes*.

² Doubtless what we call memory in animals is the embryo of true memory of man. There are in fact three kinds or degrees of memory. (1) Unconscious inherited tendencies of growth in the embryo, by which the outlines of phylogeny are repeated in ontogeny. This is *organic* memory. (2) *Conscious* memory of animals and two degrees of this, (a) instincts, (b) acquired habits. (3) Self-conscious memory, or history of ego.

the highest and most complex of all abstractions, and the necessary condition of the development of all other abstractions into clearness. It is, therefore, the underlying condition of science, philosophy, art, religion, rational organisation of society, in a word, of indefinite progressiveness. Animals cannot have it, or they, too, would have their science, philosophy, art, religion; they, too, would be indefinitely progressive; they, too, would be rational, morally responsible beings; in a word, they would in all essential respects be men.

One pregnant thought we throw out by the way and pass on. It is interesting to note here, that man rises in the scale and approaches his ideal just in proportion as he departs from the characteristically animal. In animals the whole life and activity is concentrated in the now; man, on the contrary, by memory and imagination lives also in the past and the future. His life expands more and more backward and forward, until in the ideal man he lives equally in all time, past, present, and future. He weighs in equal balance all events without prejudice in favor of the now, and is thus, as it were, unconditioned by time. This is the ideal of wise or prudent conduct—the intellectual ideal. Again: in animals the whole life is concentrated on the self, although an unrecognised self. Man—and more and more in proportion as his distinctive human nature predominates—lives in and for other selves. His life expands and incorporates more and more the lives of others through sympathy and love. He reaches his ideal in this direction, when his life spreads equally over all other lives in proportion to their real worth—when self-love no longer in the least disturbs the justness of judgment or unduly influences conduct—when self and other selves are weighed in the same just balance. In a word, when he is unconditioned by self. This is the ideal of right conduct, the moral ideal. The moral law of equal love to self and neighbor is now fulfilled. But observe: the necessary condition and beginning of this whole process of improvement is the recognition of selfhood.

VII. WILL AND FREE-WILL.

The difference in this case is similar to the last, but it is even harder to draw the line of distinction sharply, because there are many degrees of freedom with almost insensible gradations between. There is, confessedly, no subject in philosophy more difficult than that of freedom of the will. I shall not attempt to define its exact nature. My attempt will be far less ambitious, but, as I believe, far more useful. I wish to show the various degrees of freedom in animal conduct, and that the most marked of these begins with man and is therefore characteristic of him.

There are some, yea many, in these latter days, who cut the Gordian knot of this difficulty by asserting that there is no such thing as free-will, nor indeed will of any kind such as we imagine. They assert that the animal, yea even the human, body, with all its functions, physiological and psychological, is naught else but pure mechanism—the whole phenomenon of life is naught else than action and necessary reaction between the external world and the nerve-centres. If the process is attended with consciousness, as it sometimes is, then we call the reaction will; but it is none the less necessary on that account. According to these philosophers, an animal or even man himself is a pure automaton; an automaton conscious of what is going on, but wholly unable to modify the automatic phenomena. Consciousness is present, true, but only as a passive, helpless observer. This view was presented in a masterly way by Professor Huxley in his memorable Belfast address in 1874. (*Nat.*, X., 362. 1874.)

To most persons (and I believe with reason) a sufficient answer to this is an appeal to consciousness itself; but the competency of the witness is disallowed by the other party. In default of this appeal, I believe the best answer is found in the *reductio ad absurdum*. Let us try it.

If consciousness be not a factor in the result of reaction of nerve-centres under the stimulus of sense-impression, then would this result, i. e., the conduct of animals be precisely the same if

there were no consciousness. This seems sufficiently incredible; but more remains. If consciousness and self-consciousness be not a factor in human conduct, then history, or all the results of human activity, individual and social, would have been precisely the same as we now find it, even though there had never been any consciousness or self-consciousness at all. Society would have progressed, wars, revolutions, and parliamentary debates would have occurred; telegraphs, telephones would have been invented; railways and cotton-mills built; masterpieces of poetry, painting, and music achieved; science, art, philosophy, and religion would have arisen and blessed mankind. In fine, all details of work done and every word spoken or written would have been precisely the same, even though man was wholly unconscious of what was going on. Man's body and man's mind and human society, according to this view, may be compared to a complicated engine rushing along at a rapid rate without engineer, except necessity, or law, or what not. Consciousness is on the engine, true, but only as passenger. Although understanding clearly and sympathising deeply with every movement, though deeply affected with joy or grief, with hope or terror, wholly unable to modify the course of events. Everything happens by necessity, and would happen just the same even though consciousness were not present at all!! It seems to me impossible that any sane mind, unsophisticated with metaphysical subtleties and fully realising the logical consequences of this view, can for a moment maintain it.

And yet—and yet—most complicated and wonderful machinery in the animal and human body *does* work perfectly without consciousness. Complex, delicately adjusted, and appropriate purposive work *does* go on without conscious engineer. Here is the difficulty. How shall we explain it.

The animal body, as already said, is an instrument for action and reaction between the external and the internal world or nerve-centres. But there are *many degrees in the freedom of the reaction*. In the simplest and most automatic form, the steps of the process are briefly as follows: Action (*a*) sense-impression, (*b*) inward transmission, (*c*) change in a nerve-centre. Reaction (*d*) outward trans-

mission, (*e*) muscular contraction, (*f*) change in external phenomena. In the simplest case this is all. Thus, if the spinal cord, or the medulla, be the centre, action is followed by reaction with certainty and precision, and the most complex movements may be perfectly and yet unconsciously executed. The whole series is in the domain of physiology. But if the centre be the cerebrum, then at least two more links are added to the chain from the domain of psychology. The incoming current determines changes, not only in the brain, but also in consciousness as sensations, perceptions, etc.; and the outgoing current is started, not by brain-changes alone, but by will. Now, if the incoming current started by sense-impression is followed immediately, like the rebounding of a ball, by the outgoing current determining movement, without the intervention of consciousness and will, then we call the movement reflex. On the contrary, if changes in consciousness and will intervene and control the result, then we call the movement voluntary. The reflex system operates in all parts of the body and in all animals; the conscio-voluntary is superadded in some of the movements of the higher animals, and then takes control. In these, therefore, the reflex underlies and conditions the conscio-voluntary, while the latter stands above and dominates the former. If the conscio-voluntary be paralysed, or its activity be suspended by sleep or coma, then the reflex is far more distinctly and universally operative.

Thus, then, there are two primary and strongly contrasted groups of animal movements, viz., the reflex or automatic, and the voluntary. But the great gap between these is almost wholly filled by gradations from each side approaching the other. In the reflex group there are (*a*) the purely automatic movements, wholly withdrawn from consciousness as well as from will, such are the movements of the heart, stomach, intestines, etc.; (*b*) then come movements withdrawn from will, but not from consciousness, such as swallowing, coughing, sneezing, etc.; (*c*) movements attended with consciousness and partly controlled by the will, such as breathing, etc. So also, on the other hand, are there voluntary movements in various degrees approaching the reflex. (1) Movements which are entirely voluntary—*deliberate* movements requiring the whole atten-

tion, and, in some cases of complex movements, even painful attention. Such are nearly all movements made for the first time.

(2) *Habitual movements.* These require only dim consciousness and a general superintendence of the will. They are withdrawn from the full undivided consciousness, and are therefore *semi-automatic*. Ordinarily they go on without full consciousness or direct action of the will; but if anything goes wrong, consciousness and will quickly intervene to rectify, and they again relapse into semi-automatism. Walking, flying, speaking, writing, playing on a musical instrument, come under this head. They at first came under the first head, but were made easy and semi-automatic by frequent repetition. They are, therefore, *acquired by individual experience*.

(3) *Instinctive movements.* These are still more automatic. They are the result, not of individual experience, like the last, but of *ancestral experience*, inherited through many generations. They are, therefore, withdrawn from individual experience, but not wholly from consciousness and will. (4) *Reflex movements.* These are finally withdrawn from consciousness and will, but in various degrees, as already shown.

Now, all these kinds of movements exist in animals as well as in man, although the first, i. e., the deliberately voluntary, only to a limited extent, and then only in the first formation of habits and instincts. Nearly all the so-called voluntary acts of animals are either habitual or instinctive, and are determined by impulses and not by motives. But in man there is still a higher form of activity not yet mentioned, viz.: that in which consequences, especially moral consequences, are presented to the mind and weighed; in which impulses, solicitations, motives, are balanced one against another; in which all these are again made the objects of conscious thought, and we are distinctly conscious of the fact that we ourselves are umpire and responsible for the result. The determining factor in this case is will in a *higher and freer* sense than in any of the preceding. This is the *free-will* characteristic of man. No such weighing of motives (if motives there be at all in them, and not mere impulses), no such reflexion on motives as objects of thought ever occurs or can occur in animals. We call this *free-will*, not be-

cause it is absolutely free and unconditioned, but because it is *freer* than any lower form. As already said, there are many degrees of freedom of activity. Instinctive acts are free in relation to reflex; habitual acts in relation to instinctive, and deliberate acts of animals in relation to habitual. So also self-determined moral acts are free in relation to all other lower forms. There is a gradually increasing freedom of activity as we go up the animal scale. The increase between animals and man is a great one, great not so much in amount, as in the new possibilities introduced then and there. But absolute freedom belongs to God alone.

Finally, we have already shown in several departments a human plane and higher human plane; that there is a human life as distinguished from animal life, and a higher human life as distinguished from a lower. So it is here, also. There is a free-will distinguishing man from animals, and a *freer* will distinguishing a higher from a lower type of man. There is a free-will which is free only in the sense of being self-determined and therefore morally responsible, but is nevertheless unwillingly restrained by, and chafes against the bounds set about it by the all-embracing will of God, which is the law of perfect righteousness—and there is a freer will, freer because no longer restrained by external law; because the law of righteousness is freely accepted as the law of its activity; because it moves freely in loving accord with the absolute will.

Out of these two last, viz.: *self-consciousness* and *free-will*, grow the moral and religious nature of man. These, therefore, must be characteristic of man. In fact, they are the most obvious of all characteristics. We do not count them among the primary characteristics, only because they so obviously flow from the simpler elements given above.

Now, of the seven characteristics enumerated above, which, if any, is most fundamental and essential—which, if any, precedes and determines all the others? Some have said *speech* is the most fundamental and preceded all others, even thought. Yes, surely *animal* speech did so precede—but is it not evident that at least some dim perception of relations as relations, or what I have called the power of words in relation to one another, must have preceded words

expressing such relations, and therefore rational speech. Shall we say, then, that *thought*, or the perception of relations as relations, is the fundamental characteristic which we seek, and it therefore preceded speech? This seems, indeed, in some sense true: for a practical awareness of relations certainly precedes speech of any kind, much more, rational speech. But on the other hand, it is quite evident that words as the *sensible and transmissible* embodiment of the beginnings of thought are absolutely necessary for their growth into clearness—in fact, for the growth of *practical awareness* of relations into the clear perception of relations as relations abstracted from the things related. It seems to me that these two must always have acted and reacted on one another, and, therefore, must have developed together *pari passu*. As practical awareness of relations gradually developed into abstract ideas, so *pari passu* animal sounds gradually developed into animal speech, and animal speech into rational speech. All the other characteristics are similarly inter-related.

Or perhaps we may make one exception—perhaps there is one to which all others are contributory, and which, therefore, is last to arise—viz., *self-consciousness*. The abstraction of *self* from the facts of consciousness is the highest and most complex of all abstractions and may be regarded as the consummation of humanity. All the others may be likened to the labor-throes—this is the actual *birth*. All the others are like the breaking of day and the increasing twilight; this is the rising of the sun above the horizon of humanity. The discovery of self is the discovery of the world of *reality* underlying the world of phenomena. With that discovery man rises at one step into an entirely different plane of life.

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THE DUALISTIC CONCEPTION OF NATURE.

IN one form or another, monism is a necessary concept of science. For scientific research is essentially the effort of human intelligence to bring all facts into intelligible connexion with one another; and that object can be attained only when all facts are comprehended as parts of *one* intelligible system. The unity of nature therefore is implicitly assumed at the very dawn of scientific intelligence, and it becomes an explicit concept as the work of science gains in perspicuity. Accordingly, on first reflexion it must appear somewhat startling, that this monistic assumption of science should, from a very early period, have been traversed by an illusion of dualism; and in the interests of science itself, not to speak of the general interests of humanity, it becomes important to trace this illusion to its source, and to point out the injurious influence it has exerted upon human life in practical as well as in speculative activity.

The conception itself of nature involves the conception of its unity. The term *natura* expresses admirably, because literally, that eternal process of birth, to which it has come to be applied. By its grammatical structure in fact it conveys the idea more pointedly than *φύσις*, which it was used by the Romans to translate. Of neither word does there appear to be a philological history of any value for the history of scientific ideas. The use of *φύσις* goes as far back as the Homeric poems. In *Od.* x. 303, the word is used to denote the "nature" of the mythical herb *moly*, which Hermes gives to Odysseus as a counter-charm against the spells of Kirkê. The force of the word here is indicated by the fact, that a few lines before (vs. 288) the word *κράτος* is used as an equivalent to denote the "power" of the herb.

In this use of *φύσις* there is already implied the idea of some quality in a thing that makes it what it is, and cannot therefore be altered without the thing ceasing to be. In other words, the *nature* of things is conceived to be determined by the very power which makes them what they are, and thus to be independent of human will. Accordingly those phenomena, which are products of nature, come to be contrasted as unalterable with those which, being products of man, can be altered or abolished at any time by his efforts. This contrast had already become a familiar commonplace to the Athenians in the second half of the fifth century B. C., as a result of the primitive philosophical movements of the preceding century. In the speculations of Sophist and Socratic alike the antithesis is quite marked between *φύσις* on the one hand, and *νόμος* or *θεσις* or *τέχνη* on the other. In fact the great problem of that period was to find out whether the principles of man's moral life are based upon distinctions in nature, or are merely regulations of human enactment, institutions of human society, artifices of human ingenuity.

But along with this idea of nature being unalterable there runs the idea of its unity. The one fact indeed is made the corollary of the other. The essential nature of things is conceived to be unchangeable just because all their phenomenal changes are supposed to be temporary modifications of some principle which remains forever the same. To find this principle was, from the outset, the problem of all scientific inquiry. In the language of early Ionic thought this principle came to be spoken of as *ἀρχή*, at least from the time of Anaximander who is said to have first used the term in its philosophical signification.

Among the Ionics monism was thus implicitly assumed. But it became an explicit feature of speculative thought among the Pythagoreans, who may thus be regarded as the first true monists. The monad indeed became with them *the ἀρχή* of all things, and that in a far more rigid sense than with Leibnitz. For the Pythagorean monad is really nothing but the abstract idea of unity,—the abstract unity whose repetition constitutes all number, and constitutes thus also the very essence of all things.

But the Pythagoreans evidently felt the perplexity of the problem which this rigid monism imposed upon human thought. "How can the whole of things be for us a unity, and yet each separate?" *Πῶς δέ μοι ἔν τι τὰ πάντ' ἔσται, καὶ χωρὶς ἑκάστων*; is a question which the Orphic poems, though spurious, yet with a certain historic truth, represent as being forced upon human intelligence at the very dawn of reflective thought. In the effort to solve this problem the monism of the Pythagoreans collapsed into a fateful phase of dualism. Among numbers they detected two forms, even and odd; and recognising number as the essential constituent of all things, they were forced to find the same duality throughout the universe. With a curious, at times even pathetic, illustration of the limitations of human intelligence, they followed this dualistic idea into fantastic analogies of odd and even with male and female, right and left, good and evil, etc.,—mere conceits which have long ago lost all meaning and interest. But it is only fair to this old school of thinkers to bear in mind the incalculable service which they rendered to primitive science by their essentially monistic conception of nature. It was they who laid the first foundations of exact science by their efforts, fanciful though they were at times, to trace throughout the universe proportions calculable in definite numbers. They also, alone among ancient thinkers, rose above the sensible appearance of stellar movements, and conceived the earth as merely one of the planets revolving round a central point. It was in fact a fragment of the Pythagorean Philolaos, that suggested to Copernicus the heliocentric explanation of celestial phenomena. It remains, in fine, a significant fact, that the word *κόσμος*—the general Greek term for any orderly arrangement—was first applied by the Pythagoreans in the use which almost displaced its primitive meaning, to denote the universe of things *διὰ τῆς ἐν αὐτῷ τάξεως*.¹

Dualism therefore is, at worst, merely an unessential feature of the Pythagorean philosophy, and its influence is practically neutralised by the intrinsic monism of the system. But this is not the case, or at least by no means so completely, in the Eleatic philoso-

¹ Plutarch, *De Plac. Phil.*, II., 1.

phy. Here appears, for the first time, in rugged prominence, the most obtrusive dualism of popular thought and of science. The first discovery of common reflexion, as well as of scientific inquiry, is the fact, that "things *are* not what they *seem*." It is therefore one of the earliest results of reflective thought, to distinguish things as they really are from things as they appear to the senses. As the real nature of things is revealed by reason forcing us to go beyond their sensible appearance, the former comes to be distinguished as *that which is thought by reason* (*νοούμενον*) from *that which appears* (*φαινόμενον*). This antithesis is the most prominent feature of Eleatic thought. But the explanation of the antithesis remains a problem unsolved by the Eleatics. It is a knot which they cut rather than untie. They fancied the problem solved by the simple explanation, that that which is demonstrated by reason—the noumenon—is the sole reality (*τὸ ὄν*), while the sensible phenomenon is a non-entity (*τὸ μὴ ὄν*). But this is no solution of the problem. Sensible appearances *are* sensible appearances. They *exist* as such. Reason is therefore called to explain their existence, even if it be merely as sensible illusions. But reason cannot be satisfied with any explanation that is not based on a reasonable principle, that is, a principle in harmony with itself. Phenomena, therefore, and noumena, are to be explained on the same principle, and the Eleatic dualism vanishes in an inevitable monism.

Perhaps the first to see this clearly was Anaxagoras, and it is this fact that makes Aristotle speak of him as if he had uttered the first sensible word of a sober mind¹ on the problem of philosophy. Anaxagoras saw that every principle offered by earlier thinkers as explaining the essence of all things,—water, air, fire, earth, number, or whatever else it might be,—always implies something more primordial. For every such theory always appeals to reason in vindication of itself. The true principle, therefore, Anaxagoras held, must be reason. This is the ultimate explanation of all things. Accordingly, from this time forward it became impossible to leave

¹ *Οἷον νῆψεν ἐπάνη* is his striking phrase (*Metaph.* I., 3).

reason out in any attempt to give a reasonable account of the cosmos.

But naturally for man it is of prime interest to vindicate a rational unity in his own life rather than merely in the external world. In this direction no service has been rendered greater than that of the Stoics. No school has ever grasped more clearly the conception of all nature and all life as created and controlled by Perfect Reason. In fact the conception of nature (*φύσις*) was itself elevated and expanded. Prior to the Stoics the term had been mainly used, as it is perhaps mainly used still, in reference to the external material world. It was the Stoics who seem to have first applied the term to the phenomena of man's internal life; so that his moral nature and the nature of the external world came to be represented as governed by the same laws, and these the laws of Perfect Reason. Natural law, therefore,—the law of nature,—was no longer conceived as merely the mode of operation in the physical world. Henceforth it came to be thought of rather as that unalterable principle of consummate reason which finds its highest expression in the laws of man's moral life, and its lower expressions in the laws of the physical world.¹

But in spite of this apparently all-absorbing rational monism an unfortunate dualism crops out in the Stoical system. It is the old dualism of sense and reason, which had been the prominent feature of Eleatic philosophy. No longer, however, does it signalise an antithesis in our views of nature in general; it is specially centred upon an antagonism in man's moral life, which is declared to be irreconcilable. Following Plato and Aristotle, the Stoics divided off the sensibility with its passions as a function of the soul's life totally distinct from, and even opposed to, reason. Passion, for the Stoic, became explicitly what it was implicitly for Plato and Aristotle, an embodiment of the abstract essence of irrationality—

¹ Perhaps the most interesting development of the Stoical doctrine of the law of nature was in Roman jurisprudence. The later jurists of Rome, who were generally Stoics in speculation, fancied that the law of nature was to be found in their own *Jus Gentium*. The conjecture was quite unhistorical; but the Stoical theory of an ideal law of nature, which all human legislation ought to follow, exerted a beneficent influence on the jurisprudence of the empire.

τὸ ἄλογον. It is thus the moral enemy of those activities of reason which form the essence of rationality—τὸ λογιστικόν; and rationality, as we have seen, is, for the Stoic, the very essence of nature, the governing principle of all things. In its practical applications, therefore, the Stoical ethics would make no terms with passion; all kinds of sensibility must simply be suppressed. For the excellence—the virtue (ἀρετή)—of man is to be found only in a life that is in accordance with nature; and as reason is the essence of nature, a life in accordance with nature must be a life in accordance with reason. But a life that is to any extent controlled by sensibility, however gentle and amiable the sensibility may be, is to that extent irrational; and, therefore, the ideal of human excellence is a state of apathy in which life is completely controlled by passionless reason. As a result of this, Stoicism drew a painfully dualistic division between men, in its estimate of their actual characters. All men, in this estimate, must be either rational or irrational. That obvious intermingling of virtues and vices in actual life, which must be recognised in all just estimate of human character, was stubbornly ignored by the Stoic. For him that man is completely sunk in vice who indulges his passions to the slightest degree, just as—to use a common illustration—the man whose head is one foot under water is drowned as completely as the man who is covered by a thousand fathoms. No doctrine of the narrowest sectarianism in the Christian Church ever drew a harsher division between converted and unconverted.

The dualism of Stoical ethics has thus suggested the dualism which has corrupted Christianity. The indebtedness of Christian theology and ethics to the theology and ethics of Stoicism is a commonplace of intellectual history. The whole conception of the universe, as developed in the Christian doctrines of creation and providence, drew largely from the writings of the Stoics. This conception, which represents the universe as being in every nook and cranny under the ceaseless operation of Supreme Intelligence, might be supposed to exclude the very possibility of any irremovable dualism. Yet a painfully prominent dualism distorts the characteristic features of the Christian conception of the universe. It is in some

respects based on the old moral antagonism of sense and reason, in New Testament language, of the flesh and the spirit. The very excellence of Christian ethics tended to accentuate this antagonism. For by holding forth a peculiarly noble ideal of life as the fruit of the spirit, Christianity degraded into a more violent contrast the shortcomings of man's actual conduct, to which the flesh drags him down.¹ This deeper consciousness of sin, evoked by a higher conception of righteousness, has undoubtedly given a sharper antithesis to the ideas of God and Devil, of angel and demon, of heaven and hell, which make up a large portion of distinctively Christian thought. The grotesque imagery of horror which has been evolved out of this dread dualism, is indeed one of the most repulsive regions in the popular mythology of Christendom, yet it is not without a certain terrible fascination which has attracted the poets of Christendom to it as offering a fit material for the highest tragic art.

The source of a great deal of this imagery is still a problem for historical research. In the history of the subject prominence has not unnaturally been given to Manichæism. But the connexion of this system with Christianity has often been misunderstood. Manichæism is not properly a Christian heresy; that is to say, it did not spring out of the circle of Christian thought. It is not even to be regarded as a phase of Parseeism; for the Parsee creed is not, any more than the Christian, dualistic in its true interpretation. Manichæism indeed draws certain ideas from the Parsee creed as well as from the Christian; but in its essential drift it is independent of both. Recent researches seem to prove that Manichæism grew out of an old Babylonian religion modified by some elements of Parsee and of Christian thought, possibly of Buddhist as well.²

¹ It is worth noting also, that the extreme chiliasm of apocalyptic literature often pictures the present condition of the world as irredeemably irrational, to show in more brilliant relief the splendor of the expected millennium.

² See Kessler's *Untersuchungen zur Genesis des manichäischen Religionssystems* (1876), and his article in the *Real-Encyclopädie für protestantische Theologie und Kirche* (2d ed.). The older work of F. C. Baur, *Das manichäische Religionssystem* (1831), gives prominence to the influence of Buddhism.

Though Manichæism is thus to be considered as a religion outside of Christendom, it probably contributed, with the general Semitic influences which it represented, to accentuate the dualistic ideas of Christian demonology. The Devil of Christendom, though created by God, is still conceived as His successful enemy, marring the perfection of His work by a factor of evil which is maintained in existence, not only throughout the whole history of earth, but for ever afterwards in hell—irremovable by all the power of divine wisdom and love.

This influence of Manichæism upon Christianity seems to be implied in the prominence which it receives in the writings of Augustine, the man who did more than all the early thinkers of Christendom to shape the theological system of the Christian Church. It was in fact rather in Latin than in Greek theology that Christian thought tended to the dualistic conception of the antagonism between good and evil. Under the influence of the juridical ideas predominant in the Latin mind, the universe came to be conceived often after the analogy of the Roman Empire, and the Supreme Being mainly, if not exclusively, as an infinite monarch, whose laws must be vindicated at any cost. To minds dominated by such a conception of God it seems a sufficient vindication of divine law to inflict an infinite penalty on its violation,—a sufficient triumph of goodness if the will to evil is balked by banishment into some dim chaos of eternal suffering, beyond the confines of the divine cosmos. Such representations were extremely natural for minds to whom the problem of human life was mainly such jural organisation of society as it was the mission of the Roman people to work out. These representations are also, of course, useful in their place for popular illustration. But the concept of God, which they imply, is a very inadequate category on which to construct a philosophical theology. The finer speculative genius of the Greek Fathers was untrammelled by the peculiar concepts of Roman jurisprudence; and therefore it is not surprising that Origen, the most brilliant of them all, shrank from an eschatology which did not ultimately eliminate hell, finding the true triumph of good only when all will to evil is finally subdued.

But the theology of Augustine, with all its dualism, became that of Western Christendom, and has continued to influence Western thought, both in and out of the Church, even to our day. His dualistic influence, like that of the Stoics, has been very marked in the separation of man's moral life into two mutually exclusive conditions or spheres. The state of nature and the state of grace are two concepts, the antithesis of which has been peculiarly distinct in all theological speculation moulded by Augustinian influences. The early history even of modern philosophy can scarcely be understood if we fail to note the fact that the Augustinian definition of these antithetical concepts formed a prominent subject of controversy about the dawn of modern speculation. In the Catholic Church Jansenism was substantially a revival of Augustinianism; and though the Jansenist doctrines were condemned by a papal bull enforced for political purposes by Louis XIV., yet they formed the creed of the finest minds in the Church of France. They were specially associated with the eminent men who lent the lustre of their learning and literary power, as well as of their piety, to the Oratory and Port Royal during the seventeenth century, and it is a fact of some import in the history of philosophy, that it was among these men that Descartes found his most enthusiastic disciples and his most brilliant expositors. In the Protestant section of Western Christendom, too, the essential drift of Augustinian teaching was revived in Calvinism; and Calvinism became the predominant phase of religious thought among the most distinctive representatives of the Protestant movement. It drew out all the passion of intellectual as well as of religious life among the Huguenots of France, among the Anti-Remonstrants of Holland, among the Puritans of England, Old and New.

But here, as often elsewhere in the history of human thought, extremes meet. For, while Jansenism and Calvinism represented the most intensely religious movements of human thought in the seventeenth century, on the other hand, in that century at least, probably speculation never took a more blankly anti-religious direction than in the philosophy of Hobbes. That philosophy is an attempt to construe all the phenomena of the universe, including the

phenomena of man's life, by eliminating all the essential ideas, not of religion only, but even of morality, and reducing nature to a play of purposeless, non-moral agencies. Hobbes's conception, therefore, of the state of nature in human life is fundamentally that of Calvinist and Augustinian. His cool, callous exposition of this concept—his description of man's natural state as a *bellum omnium contra omnes*, caused by all men being naturally actuated by egoistic impulses alone—all this is not only paralleled, but even exceeded, in its repulsiveness by the language of eminent Calvinistic divines.

A similar meeting of extremes is found in the comparison of Calvinism with another system of philosophy, which was almost as great a horror to orthodox thought as the system of Hobbes. The system of Spinoza seems indeed in many ways a complete contrast to that of the English philosopher. Yet beneath the apparent antithesis of the two systems there is a profound affinity. Though Spinoza starts with the idea of God, which is an adventitious adjunct to the system of Hobbes, yet his definition of the idea, reducing it to that of mere substance or being,¹ scarcely carries us beyond the agnostic concept of the Supreme Being, which is all that Hobbes allows. Moreover, Spinoza's identification of will and intelligence in God simply means that all we understand by intelligent activity disappears in mere will. The volition of God is therefore explicitly denied to be an act of purposive intelligence. Creation is a purposeless evolution of the eternal substance, a necessary modification of its attributes in accordance with its own irresistible laws. Under such a concept of creation there is no room left for independent activity or personal responsibility on the part of the finite individual. Consequently all the ideas of moral life are relegated by Spinoza among the illusions of "*imaginatio*," that is, the intellectual activity from which all error arises, and which is therefore carefully distinguished from the genuine knowledge to be attained only by *ratio* and by *scientia intuitiva*. As a result, Spinoza explicitly coincides with Hobbes in his conception of man's natural state. In this

¹ "*Ens absolute infinitum, hoc est, substantiam, etc.*" Spinoza's *Ethics*, Part I., Def. 6.

state man is declared to be void of those ethical *imaginiones* which grow only out of the soil of civil life.

The conception of nature by Hobbes and Spinoza was in a way thoroughly monistic; but it attained this character only by confining the term to the lowest class of phenomena, and ignoring the phenomena of intelligent moral activity as artificial conventions of society. It requires no very subtle argument to show that, under this analysis, the obligations of social union themselves disappear. For if there is no obligation *a priori*—no obligation *in the very nature of things*—to observe a contract, then the so-called social contract itself is left without the support of any such obligation, and it simply remains a question whether the individual cannot outwit by superior astuteness, or resist by superior power, any governmental machinery that may be devised to enforce the contract. A similar issue is inevitable under Hobbes's analysis of religion. If the very nature of things, as unfolded by science, does not involve the essential ideas of religious life, then it is impossible to create a religion by artificial enactments of any civil authority. This fact is overlooked by Hobbes and by Comte as completely as by the agnostic champions of ultramontaniam in the Church of Rome. It is not therefore surprising that Hobbes's philosophy of religion and morals should have met with strong opposition from men who were in earnest about the obligations of moral and religious life. Their opposition commonly took the form of a return to the larger and nobler conception of nature which had distinguished the ancient Stoics. A long line of writers, especially among the moralists of England, sought to trace, either in the nature of man or in external nature, if not in both, the foundations of his moral and religious life. Again the old Stoical conception of the law of nature became familiar in ethics and jurisprudence, and all positive enactments of human societies were viewed as merely imperfect embodiments of the law of nature. Accordingly men became accustomed to conceive the problems of moral and social activity as implying an endeavor to break through the artificial trammels by which civil society was cramping the life of man, and to get back to the simple requirements of nature, of natural law.

It is not difficult, and it is profoundly interesting, to see how this conception of life's problems represented the drift of the great historical movements by which last century was characterised. The claim of individual freedom against unreasonable restrictions of social law had become inevitable, partly under the trend of speculative thought, partly under the impulse of social conditions themselves. For never perhaps in the history of civilisation had human life entangled itself in such a complicated net-work of exacting regulations. Every sphere of man's activity from the highest to the lowest,—religion and literature, morality and etiquette, military and political and industrial life,—all were subjected to minute and often petty and even vexatious restrictions that prevented the natural and reasonable expansion of the human spirit which it was their proper function to develop. Never had the clothing of custom, in which of course human life must always invest itself, become so worn-out, so ill-adapted to the wants of growing humanity. The great revolution, which shattered the old life of Europe as the century closed, was an outburst of passionate impatience on the part of European society to get rid of its worn-out clothing before it had well considered in what fashion it was to be clothed anew.

This memorable movement is commonly regarded by historians as having found its most characteristic literary expositor in the writings of Rousseau. There we find the reactions against the social philosophy of Hobbes and Spinoza carried to its extreme. The contrast, which these philosophers had drawn between man's natural state and his civil state, is by Rousseau completely reversed. The state of nature he conceives to be one of innocent social equality, which has simply been corrupted by the artifices and restrictions and divisions which political institutions have introduced.

But the extravagance of this theory as well as of its opposite arises from the fact, that the state of nature, as defined by both, is a pure fiction of abstract thought. It is an attempt to conceive what man would be if we were to eliminate all those factors of his life which are derived from social organisation. It does not matter that in one case these factors are supposed to be the virtues by which human life is adorned, in the other the vices by which it is

corrupted. In either case the error is the same. It consists in taking a fictitious abstraction for a reality in nature. It ignores the only human reality that nature knows, that is, man living in the social state. The absolute solitary is not a natural man. As Aristotle said long ago, he is either a god or a brute.

It is evident then that all dualistic separations of man's life into spheres that are mutually exclusive originate in an imperfect conception of nature in general, but of man's nature in particular. This imperfection continues to mislead scientific inquiry. Human nature is still at times defined by concepts which imply a merely animal existence; and an attempt is made to interpret human actions simply as effects naturally resulting from impulses of pleasure or repulsions of pain. On such an interpretation of human life science must of course pronounce all morality of a spiritual or disinterested nature to be not only impossible as a matter of fact, but even incapable of any rational vindication. In like manner if nature in general is defined by similar narrow concepts, if nature is understood to mean the universe with all the rational purposes of human life eliminated, then it may be perfectly consistent to assert that there is no morality in nature, or even that nature is profoundly immoral. But the evolution of the universe with the history of man eliminated is the drama of Hamlet with the part of Hamlet left out. It is the life of man that at once forms the most essential part of the problem of all science, and furnishes the most essential data for its solution. The truth is, therefore, that scarcely one eminent thinker has fallen into this narrow conception of nature without at the same time protesting more or less explicitly against its inadequacy to satisfy the demands of scientific thought. More than one noble passage might be cited from recent literature, in which the scientific thinker rises to the part of a modern Prometheus, defying the non-moral omnipotence that he seems to see ruling in external nature, and asserting the power of man's internal nature to act upon a moral law of love in spite of any suffering which the non-moral laws of external nature may bring about as the result of his action. Nor is such Promethean assertion an abandonment of the scientific attitude of thought for an idle bravado of fancy. It is rather a rec-

ognition of the fact that there has always been in the universe a power adequate to sustain the man

"Who trusted God was love indeed,
And love creation's final law,
Though nature, red in tooth and claw
With ravin, shrieked against his creed."

Science therefore must give to the reality of this power a prominence equal to the reality claimed for the force of non-moral causation, and it can escape from an incomprehensible dualism only by advancing to a conception of nature, which embraces both in intelligible harmony.

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NATURE AND THE INDIVIDUAL MIND.¹

I. OBJECTIVE AND SUBJECTIVE.

MY body is a part of nature. My individual consciousness—on this point there can be no doubt—is absolutely dependent on the structure and development of my body, on my organisation, and consequently also on nature. Is, therefore, my ego, am I myself, only a part of nature? Or, to put it differently, how does my ego differ from nature? It will be said, by consciousness. I discover in myself mental representations, volitional impulses, and feelings; but in nature I meet with bodies and motions in space. We are simply confronted here with the old question, How can physical things be converted into psychical states? The change from one species of existence into another altogether different from it is absolutely incomprehensible. We must inquire, therefore, whether any such fundamental distinction really exists between the spatial object and its mental representation. Possibly the problems involved in the relation of nature and the individual mind will find in such an inquiry their own solution.

The moon moves about the earth, it exists. *I*,—my individual mind,—am not a condition of its movement and existence. The moon takes no account of my individual ego. This moon is called an *objective part* of nature, a body in space; and such it really is. I now look at the moon and see it. In this act both the moon and myself are necessary—a definite collocation in time and space of the moon and myself. The moon which I see is called in reference to myself a *perception*. Thirdly, and lastly, the moon is invisible.

¹ Translated from Professor Lasswitz's manuscript by Thomas J. McCormack.

I simply think of it. Here I alone am necessary and the moon not, at least not at the same time. This moon is called a *representation*. The last two moons are called *subjective* phenomena, because I am necessary to their production. In what respect, now, do these three moons differ from one another?

No one need see the first moon. The second, many may see together. The third, I alone see.

What is meant is this. The objective moon produces effects, or, generally speaking, is the subject of relations over which I have not the slightest control. The perceived moon cannot produce such effects, unless I tacitly introduce the objective moon in some way or other and consider more than its mere relation to myself. It is true, the existence of this subjective phenomenon is not entirely dependent on me, for the moon must be within my range of vision, but its existence is nevertheless largely co-dependent on me. The represented moon, if I disregard the fact that I must at some time or other have perceived the moon, is entirely dependent on the states which I comprehend under the name of my ego.

What are the real facts here? Does the common theory hold, that the objective moon becomes my perception or representation by having a copy or symbol of its actual existence imported into me and by its having its physical reality transformed there into psychical reality—into my mental representation? Are representations a new species of existence as distinguished from real existence? Is this the reason that the represented moon has not the same obtrusive characters of existence that the real one has? If this were the case the spatial bodily world, or nature, would undergo in the mind of man a transformation into something unspatial, the spiritual or mental. As representations, things would take on a different mode of existence. The physical would be convertible into the psychical.

In opposition to this theory I shall attempt to show that no such transformation takes place. Objective things are distinguished from their subjective representations, not by their ceasing to be corporeal, and taking on another, spiritual, form of existence. On the contrary, in both cases we are concerned with definite relations of the same kind. What takes place is this. The determined combi

nations of elements which represent things in space are altered by the reception of new elements and lose thus their distinctive character, whilst simultaneously a change also takes place in that special combination of elements called the ego. Objective and subjective are distinguished solely by their different existential contents. If our perceptions and representations appear to be altogether different, and, as they really are, more evanescent and indeterminate, as compared with objective things, the reason is that the *content* which is severally compacted and unified in them is different. The factor which alters the objective determinateness of things is combination with the countless and varying modifications which are introduced from all parts of the world into the nervous system and brain of man, and this change by the participation of the elements called the ego is our sole object of reference when we speak of representation as opposed to thing. But the *law*, or rather the conformity to law, by virtue of which the unity of things and the unity of representations originates, is the same; the two are formed at the same time, but embody only in part the same content.

After this brief provisional statement of our theory, we may enter at once into the consideration of details.

That bright, round thing which exists as the moon in the heavens, and that bright, round thing which we perceive as the moon, are one and the same. If I call the first *objective*, I do so because it is connected by law with astronomically determinable movements of the earth and the sun, and hence is known as a spherical body of this or that magnitude and composition; and in calling the second *subjective* I do so because of its connexion by law with certain physiologically determinable changes of my nervous system which I am conscious of as sensations and feelings. True, reference to nervous systems, under conditions of law, is also necessarily implied in the aforementioned objective combination, but only to the extent of its being determinable by law as a like effect on many nervous systems. If I wish to single out this latter relation, I call the moon an objective heavenly body; but if I wish to emphasise that I am considering especially a modification of *my* nervous system, together with the system of the moon, I speak of my subjec-

tive representation. The difference is not that we are concerned in the one case with sensations and in the other not ; for we cannot define the objective moon without sensations. Both are real in respect of being systems, determined by law, of qualities and quantities in space ; the objective moon consisting of such as are mathematically determinable a long time ahead, whilst the subjective moon involves in addition relations that depend on the individual constitution of single men, and hence can never be fully assigned. Consequently the subjective is something that is always more or less indeterminable, something that always partakes of the individual, and on this ground solely it appears as a different kind of existence—the psychical or spiritual.

The first objection we shall encounter will be to this effect. That moon, which hangs there in the heavens 360,000 kilometres from the earth, and my representation of that moon, are two different things ; the one is outside in space, the other is inside in my mind.

This last we deny. They are different, it is true, yet not by their mode of spatial existence, but by the character of the elements involved. Has any one ever pictured to himself the moon otherwise than in space? The represented moon, therefore, is as much in space as the objective moon, and that which distinguishes the latter from the former is not a different kind of existence, but simply a different combination of the constituent parts of the same existence in consequence of which the one is designated objective and the other subjective. And if the objection be made : “I do not extend to the moon, how, then, can the represented moon be inside me?” I answer, if the word *I* is to mean only my body, as that is marked off in space by my skin, then I do not extend to the moon, and it is on this account that the moon is said to be “outside.” But if the word *I* signifies everything that makes up the present contents of my existence, the rich total of relations by which a part of the world is so joined with me that I have experience of it, then the moon belongs just as much to me as my body does. And everything we assign to our ego in this manner, we call our representation, in order to distinguish it from that which under other condi-

tions exists without our ego. But a difference other than a difference of the mingled contents is not present.

The moon and the earth, the path of the luminous rays, and everything else that is necessary for my seeing the moon—all these elements form, together with my body, a system of law-determined relations. Exactly the same elements also form a system of relations with the body of some other man, say my neighbor, and the only difference in the two cases is, that in place of my body that of my neighbor has been substituted, and thus a few of the relations have been changed. And thus these elements, moon, earth, light, etc., form with every human body new and different systems, which contain all the first-mentioned elements under such modifications only as are required by the different human bodies distributed in space, with their various individual differences. The element "moon," which is common to all these systems remains in all these modifications the same moon, and in so far as it is determinately related to the earth, light, etc., independently of the bodies of men, it is the objective moon above in the heavens. On the other hand, in so far as it appears in any of its myriad relations to single human bodies it is the perceived moon, or, when certain other relations, given in the conditions of individual men, are added, it is simply the represented moon. When this last is the case, all determinative data are missing by which the moon's astronomical position in space for the moment is determined, phases of illumination, etc.; its constitution is almost wholly determined by states of my ego, and only a part of the elements that constitute the objective moon are present. These are not sufficient for inducing that distinctness which the object itself possesses, but they have undergone no essential alteration. Care only must be taken that the difference between objective and subjective is not found in a different species of existence, physical and mental, etc. For it is precisely the problem set us to clear up this difference between object and representation.

Our view, then, is as follows: There are not finished, perfect things of which more or less accurate copies are produced in similar finished individual minds, but there are simply law-determined

systems of relations, to which our bodies also belong. These systems are objects and at the same time they are subjects. Objective existence and subjective representation are not two different kinds of existence, but are different simply with respect to the contents of the elements associated in them. That is objective which recurs as the same content in all combinations; that same content is subjective when those relations are added that arise from connexion with the human organism. As I myself am such an organism, no combination can exist for me in which my body does not participate. The reality in which this combination is given is called *consciousness*. As this reality and the existence of our bodies are inseparable, we call ourselves conscious beings and are prone to regard this consciousness as a special kind of existence, which was originally created in us by the action of things, which in contrast to ourselves we regard as another form of existence.

But as a matter of fact, consciousness is the only form of existence we know of. The sum-total of what constitutes the existence of an object is the relations of its properties to one another, and to other things; hence this existence is of the same kind with that which we specially designate the contents of our individual consciousness. For my ego, too, consists entirely of relations between colors, sounds, magnitudes, shapes, tendencies, etc., called my representations. Without such contents the ego regarded as individual mind is impossible. The distinction between mind and body is a distinction *within* consciousness. If we call the moon a body which is defined by its position, size, weight, and motion, and which existed long before men or human consciousness existed, then, of course, the moon is declared to exist as an independent regular system, quite independently of the existence of man. But the determinative data of space, time, size, weight, etc., which represent the thing moon, are exactly the same as the data which we find now in consciousness, since men and astronomers exist. The form of consciousness we can neither take from them nor give to them. It follows, therefore, that these laws which now we have discovered to be laws of *human* consciousness, are naught else than the *universal* laws under which the development of nature proceeds

and ever has proceeded, and under which we human beings, too, have been developed. In other words, the laws under which alone nature can be represented and our own present existence in nature understood, may just as well be termed laws of nature as laws of consciousness. The two are identical.

During this process of development of consciousness, now, a separation is effected of the contents known to us as our experience. One portion proves to be largely independent of the portion which we call our body, and its occurrences are mainly recognised as conformable to law; hence its appellation *objective*. The other part, whose contents are largely modifications of our own body, cannot, in like manner, be shown to be conformable to law, except with the help of the objective; its chief distinctive feature is that the changes falling under this head are connected with feelings of pleasure and pain. For this reason the ego appears to be a unit *sui generis* as compared with the rest of contents, and hence this part of the contents of consciousness is called subjective.

The two parts, however, are not necessarily distinct; they are not given *previously* to knowledge but are originally made separable *by* knowledge. To the savage, nature is not absolutely objective and conformable to law, but is an undetermined province of experience like any other. Even the phenomena on which he habitually relies can be interrupted any moment by sorcery. Nature, as it is objectively characterised by modern science, first originated with civilisation. For example, the moon originally appears in connexion with our body as a system wherein, in the earliest stage of civilisation, the moon was not singled out as something objective. The systems "moon" and "body" were separated only after much experience—after we had discovered that we could not control the moon as we controlled our hand. Advancing knowledge constructs from the regular motions of the moon a system which is clearly distinguishable from its connexions with our individual experiences. And the development of astronomy ultimately defined in mathematical equations and measurable properties and quantities the moon as an objective heavenly body. But even this separation

is incomplete, and increases with every augmentation of our knowledge of the moon.

Knowledge, therefore, is that process, rigorously conformable to law, in which on the one hand the contents of the world take definite shape as objective occurrences of nature, and on the other as experience of the laws of the same. There remains the still unknown part of the world-content as a problem which is constantly new, as the still undetermined source of all immediate subjective experience in conscious individuals.

II. PHYSICAL AND PSYCHICAL.

A large part of the difficulties which the relation of the objective and subjective offers, rests on a conception of the nature of knowledge which may be briefly termed the dogmatic. In this conception nature is regarded as a finished and independent product, as a fixed external power. Eternally inherent in the foundations of things, this power, or unalterable complex of relations of bodies in space and time, is then contrasted with the human mind as an extraneous alien element. It has its own laws, its iron necessity of action, and to complete the contrast the human mind also is regarded as an independent power. The problem of the human mind then is to convey this rigid alien power into consciousness and to accommodate itself to it or to overcome it; the assumption being that nature, during this operation, remains without, whilst only copies or symbols, so to speak, of her existence enter consciousness. Knowledge, thus, appears as the process of transforming nature into consciousness, and knowledge of nature as a sort of repetition of nature in our mind. Laws, concepts, perceptions, are not themselves nature but merely symbolical representations of nature. The world-picture which science sketches may therefore be quite differently constituted from nature; it differs from the latter less by its imperfections than by its form, as a map differs from the real country which it represents. Man cannot transport nature into his mind, no more than he can bring a country into his room; but instead of so doing, he constructs a map, and if the map be correct he can safely act upon its information. The principle of this dogmatic

view, accordingly, is that it presupposes nature as a finished product which existed previously to knowledge and without knowledge, and that it is the task of knowledge to master it. Of course on such a supposition mind also must be regarded as a similar power independent of nature and knowledge, and it remains forever intelligible how things in space, or even trustworthy symbols of things in space, can get into the mind. This dogmatic view, according to which nature essentially exists in a finished state previous to knowledge, may assume the form of materialism or spiritualism, of monistic Spinozism or hylozoism.

As opposed to this, the critical view of nature teaches that the opposition of nature and mind, object and subject, is originally produced in and by knowledge. Knowledge in the critical philosophy is not a subjective process which takes place only in the consciousness of the individual man, but it is the necessary foundation of whatever is common to all individuals, that is the condition of all actual shaping of experience; it is the real process in which the development of nature and the development of the subjective mind alike are accomplished. The same laws control the mutual action of bodies in space as control our necessary representation and rational conception of them. Things are not carried into our minds from outside, producing in us copies of nature, nor do we project subjective representations outwards into space; but things and representations are the same. They arise at the same time and are differentiated simply by the different arrangement and unitary composition of their constituent parts. Our knowledge of nature is not a symbol of something unknowable outside of us, but that outside of us itself, combined with the various special changes arising because my brain and not that of another person is connected with it. My psychical experience of this piece of nature is the cerebral process involved in the connexion mentioned. And, since naturally I can have such experience only by means of my own brain, I have knowledge of it only by means of myself, and call it the consciousness of my ego. The same occurrence, viewed apart from the fact that I am the subject of it, is called the physiological brain-process. (We shall develop this point later on.) When I perceive

the moon, the moon of the heavens does not engender in my mind an image, but the moon actually constitutes, as it is seen in the heavens, a part of the relations making up my ego.

In this view nature is never a finished thing but develops along with knowledge and under the constant correction of knowledge so as to form a system which gradually taking the shape of a connected web of phenomena subject to law becomes more and more distinctly separated from the phenomena of which we have experience in the individual systems of human bodies. The latter, however, never become absolutely severed from nature ; on the contrary, our knowledge of their mode of connexion with nature increases in exactness the more rigorously the laws of the phenomena dependent on them are ascertained. As our representations grow more precise, the more precise grows the system of objective nature.

The objective reality of natural phenomena is not impugned by these considerations, but the subjective reality of the world of representations is placed on the same footing with natural phenomena, in that both are shown to be jointly involved in the same development and are not the conversion of two different kinds of existence into one another. A body is nothing but a rule or condition determining that certain changes must be effected in space, and this we call reciprocal action with other bodies, or, to use the phrase of modern science, transformations of energy. It is implied in the same condition, that if the body comes into definite spatial relation with my human body, changes are produced in my body. On the other hand, my individual mind is nothing but a similar determinative condition, requiring that an extremely large number of changes in time and space shall form a unit experienced as "ego." Among these relations of time and space is found one which constantly recurs and which I call my body. Its changes, therefore, are experienced as changes of my ego, and hence I have experience of another body acting on my human body, as a change of content of the determined state called my individual mind. This "having experience" is simply a term denoting that a change of the system called my ego is taking place. But it is not another new species of existence added to the changes of my body; and if I distinguish

this kind of experience as mental or psychical from the changes of other bodies which are conceived as physical, my distinction merely implies a different grouping of the changes of reality; physical changes being such as are accomplished without the immediate intervention of my ego.

It is impossible to describe the immediate experience which every person has of himself, and by means of which he knows that he exists, or that a given content is undergoing changes. Colors, resistances, temperatures, etc., fill space and time as the qualities of objects; this fact, and the fact of their change, coupled with the state called feeling, is "having experience." As far as our experience extends, so far our ego extends. But whence experience originates, cannot be explained, because it is the original fact to which all explanations revert; it is the given occurrence, the phenomenon, which must be assumed. Experience, therefore, is the form in which the determined contents of time and space confront us. We know it only in our individual ego and nowhere else in the world; but we have irrefutable reasons for supposing its existence in numberless other objects, and to these we give the appellation of conscious beings or individual minds.

"I am a mind," therefore, means, "I experience something." This something which I experience is called the content of my ego; it is experienced. The content and the ego are not to be separated; the one without the other is unthinkable. In so far as the content is experienced as a unit, we have an ego, a mind, a thing which does the experiencing; and in so far as all unity presupposes multiplicity, which is one by virtue of that unity, we have a content, a thing experienced. The spiritual or the mental, therefore, produces no effects in the contents of what is experienced, it is merely the point of reference, the bond of unity, by which a definite content forms the system known as my ego. But everything I have experience of, I experience exactly as the content that it is. The changes which bodies, and with them my body, mutually suffer, are the determined relations in space which we call nature. Whether they are experienced or not affects neither them nor their laws. They remain exactly what they are and what we in scientific language

understand by bodies. When they are experienced by an ego, they are not transformed into something mental, but they simply make up by their connexion with the body of a man a new content, a compound of a more evanescent and undetermined kind, whose unity with reference to bodies still remains the law, but taken by itself as ego has that compound as its content.

The fact, therefore, that the phenomenon of experience, the existence of the ego, occurs in nature's domain of law, in the time and space determined world-content, takes nothing away from the necessity of events, nor from nature's rigidity and conformity to law. But the conditions of this rigidity are not to be sought in the unity of the ego, but solely in the unity of events, by means of which bodies in their varied relations of time and space are determined without reference to the fact that they constitute parts of the content of an individual ego and are the subject of experience in that ego. Or, it may be put thus: That same determined unity of relations which we know from experience, and in so far as we have experienced it, as the individual human mind, is denominated an objective body when it is regarded without reference to its having been experienced by an ego and is to be determined solely by its reciprocal relations and actions with other spatial systems. If we wish to emphasise simply the determinateness by law of a spatial system, as is done in natural science, we call the event in question a physical one; the same event is called psychical, where, as in psychology, it is presented as a component part of the experience of an individual mind.

The reader will now perhaps have a more precise idea of what was meant when I said that things and their representations were the same, differing only by the changes due to the participation of other systems. If I am dealing with physics, I say, there are material systems which have experience of themselves, but for my present purposes they do not come into consideration in this respect. If I am dealing with psychology, I say, all things are constituent parts of some consciousness. Changes which I experience psychically in myself are physical only for a second outside observer; but in so far as changes are produced hereby in the contents of the ob-

server's system, his experience also is altered. Men act psychically on one another solely through physical means. But this does not mean that there is a transformation of psychical into physical here, or of physical into psychical, but that given connexions in space get altered, and that psychical change simply signifies that kind of change which from the point of view of the individual system occurs in that system itself. The brains of men belong to a definite connexion of things in space, which for every one of these brains is partly the same, but is also partly disturbed and differentiated by other connexions. Hence the units which experience them are in accord in a certain measure, whilst they also present the common differences which separate individuals.

When I ascribe physical and not psychical existence to the moon, I mean simply that we are concerned with definite relations which are quite independent of their being experienced by any one; and when I ascribe to my representation of the moon not physical but psychical existence, I simply mean that the aforementioned relations or parts thereof for the time being are joined with other relations which I experience as my ego. But they are on this account none the less physical even in this new connexion with the processes of my brain: and the aforementioned physical moon is none the less psychical in all cases where its objective law is *conceived* by some one. The moon is differentiated from my representation of the moon solely by the fact that now are formed into a unit just those relations which at the moment in question subsist between the condition of my nervous system and brain and the physical system moon. All this is the rigorously determined content of the system, and in so far I can call it physical; but we can just as well say it is all psychical, by experiencing that content as a unit.

If we understand by representation not the represented content but a special activity, the act of representing, it would naturally seem as if something new were added to the represented content. But this rests on an illusion. No one will find in his consciousness, besides what he is representing, say moonshine, an additional special activity of representing; he will find, perhaps, a new additional content, namely, the thought that he has before him a repre-

sentation and not an actual perception, that, the moon as an actual fact is not above him in the heavens. Or, he will find, as, for example, we always do, when we are trying to remember something, a dark and obscure content, out of which some one part gradually grows more distinct. Or, he will be conscious of a feeling of effort, such as is associated with all voluntary change of representations; he finds this conation and desire itself; but all this, because he discovers it within himself, is to be denominated the content of his consciousness.

We may, indeed, unhesitatingly term the process of representation an activity because of its being associated with the feeling desiring it, with the represented aim. It would be only incorrect to maintain that we made something external internal by this representation; on the contrary all we do is to change the constituent elements of a content. We hear the sound but we cannot hear the hearing. In the act of representation, therefore, we have not to see a transformation of the temporal and spatial content of our ego by an activity of consciousness, but simply the actual process in the content, in so far as it forms a unit. If any one should say it was precisely this forming of a unity in the ego which he called the transition from the physical to the psychical, there need be no quarrelling about words. All that must be established as a matter of fact is that the expression "transition" is misleading. No change is produced in the content by consciousness except the changed arrangement of the component parts as units.

Or, perhaps the following objection will be proposed. When I look at the moon, I find in my consciousness brightness of definite form; I feel the beauty of the illuminated landscape; I have a sacred sense of rest; within me are sensations and feelings. But the physicist tells us, in space are only ether waves of definite periods of vibration, radiant energy which is transformed in the retina and in the brain into chemical processes; here there are only changes of energy in the nervous cells, expansions of the vessels, changes in the circulation of the blood. Where and how, then, does the physical of motion pass into the psychical of sensation, into feeling? For different they certainly are.

We have not expressed ourselves with sufficient clearness, if the foregoing objection appears valid. For this supposed objection is the very fact to explain which we have adduced all that has preceded, and have come to the following results.

Sensation and feeling are the content of nature as experienced when a human brain is parcel of the time and space system of law-determined phenomena. This same system is called physical whenever its law-determined connexions in space are considered without reference to their unity in an individual consciousness. It represents the relations as they must be conceived in a universal consciousness. Knowledge is the process in which multiplicity becomes unity in a universal consciousness, that is, is converted into a *content*, which as individual consciousness, as sensation and feeling of the ego, perceives itself dependent on the determinations of the universal consciousness and distinguishes this from individual experience as objective and physical.

III. THE SO-CALLED PARALLELISM.

Two students were discussing the meaning of a term in mathematics which involved the rate of increase of a sum of money the interest on which at the end of each term was compounded with the principal and then drew interest itself with the capital. One said: "Capital is a sum owing, which draws interest." "No," contended the other, "capital is a sum owed, a debt, on which interest must be paid." Which was right? Plainly both. A capital which is drawing interest is necessarily always an asset and a liability both; it must belong to somebody and it must be lent to somebody; a payment always presumes that the payment is made and received. But in the mathematical law which regulates the increase of the capital, there is contained nothing of this. For the law is not concerned with two different sums of money, but with one sum of money, which increases by a definite rule. The value of the result only is different, according as I have to pay or as I receive the same. For me, the individual, everything hangs on this condition; but the mathematical determination of the value is independent of whether I am debtor or creditor.

In like manner—for *omne simile claudicat*—it does not alter the determinative relations of things generally, whether the contents produced by such relations are objective happenings in nature or are experienced by individuals as sensations and feelings. Persons who regard the physical and the psychical as two distinct lines of development are like the person who regards a sum of money lent and its correspondent debt as two different sums of money, and who might be supposed to assume that the one was transformed into the other when possession changed. As a fact, the change consists entirely in the adoption of a new unit of reference, with which the same sum of money forms a different system. Similarly, the same change in space, if it be viewed as a determinative activity merely, is physical, but for the system changed it is psychical,—at least when this is a human brain, for otherwise we know naught about it.

That the human brain is not an apparatus in which spatial motion of molecules, or, to speak in more general terms, physical energy, is converted into sensation and feeling, is evident from the fact that this energy does not disappear as such, but is preserved in the physiological process, in the chemical transformations of the organism. When a stimulus excites our nervous system, the form of the communicated energy, it is true, is changed in the course of the nervous process. Mechanical energy is converted into thermal or chemical, and this again into mechanical, but it is always present as energy. For an outside observer who had it in his power to trace and accurately measure these transformative processes, the energy absorbed would still always be, and entirely be, energy in space. That we have during these processes the sensations of brightness or warmth, of pleasure or of pain, is an attendant phenomenon which happens as the experience of the person only in whose brain the transformations of energy considered take place. But no energy is consumed in producing this psychical effect; energy is only consumed in producing the physical effect. And this last is naught else than the quantitative spatial expression for the changes which are experienced in our individual consciousness.

It is the fundamental attribute of knowledge, its very essence in fact, that by it something undetermined is transformed into some-

thing determined. No reflexion can carry us beyond this original process; union of what is many into what is one—synthesis—is the fundamental form of all being; space, time, content, law, are its species. When masses distributed in space assume certain positions with respect to one another, this is simply the incorporation of a determinative state by the unity of a law, is synthesis, and when the results of thousands and thousands of years of human history meet in the ganglionic cells of the human brain, they, too, are compounded by law; here, too, we have synthesis. But experience shows us that this synthesis means for us sensation, feeling, or idea. The brain, therefore, is an apparatus not adapted for transforming a spatial synthesis of molecules into a psychical synthesis of representations, but it is merely that apparatus concerning which we know from self-experience that the spatial synthesis of the laws governing its motions is experienced psychically as a synthesis in consciousness. Synthesis, therefore, exhibits in this case two aspects, a physical and a psychical.

This is frequently expressed by saying that a complete *parallelism* obtains between the physical and psychical. The same event, viewed in its aspect of being determined by law, that is, viewed by an outside observer, is a physical event, but as experienced in itself as the unit of the system, it is a psychical event. Nevertheless, the term "parallelism," as expressing the relation between the physical and the psychical, is not quite apposite, and it is preferable to avoid it; the following misunderstandings being very apt to arise on the assumption of such a relation.

Starting from the assumption that physical phenomena, or, as they are commonly termed, material phenomena, are the objective facts, these phenomena are held to be the original primordial reality which lies at the foundation of all existence, whilst psychical or spiritual phenomena are regarded as the inward aspect of the same. In other words, it is assumed that matter, whether in its ultimate particles or in certain complex units and systems thereof, is ensouled, possesses, that is, attributes of the conscious order. Hence all material phenomena are in their inward selves accompanied by con-

sciousness. In this form the parallelism-theory is termed hylozoism, or empsychosis of matter.

Or, it is assumed that physical and psychical are two forms of appearance of one and the same third thing, of one and the same unknown substance, whose attributes of extension and thought only are accessible to us. The law-governed development of this substance is the world-process, which presents to us, consequently, a double aspect—that of body and mind. This form of the theory of parallelism, which is due to Spinoza, frequently bears the name of monism.

Both views are untenable, because of their dogmatic character. They assume that there exists, antecedently to knowledge, a system of law-governed, determined states, of definite content, by reason of which nature and its parallel phenomenon, consciousness, are developed. But whether such system be termed, in the language of physical science, matter and force, atoms or energy, or whether in the language of metaphysics it be termed substance, identity, or something similar, it is always erroneously assumed that knowledge is indissolubly connected with, and absolutely limited to, the outward cosmical or metaphysical order, the function of the former being that of an empirical and psychological process, and it being supposed that the latter is developed and finished prior to all experience. In such event not only is individual consciousness, the empirical ego, indissolubly connected with nature, which is a fact, but there exists no other possibility for consciousness except that of developing under the necessity of her determinations. The demands of science are perfectly satisfied by this position; but it is utterly incomprehensible how the categorical requirements of the moral law and the freedom of self-determining persons is to be reconciled with natural necessity. Ethics, æsthetics, and religion would be converted, under such dogmatic constraint, into subjective illusions. The world would get its theoretical construction, but practically it would be inaccessible.

The critical view has freed itself from this constraint. In a certain sense it is permissible also in the critical philosophy to speak of the parallelism between the physical and psychical, but

these terms must here be understood in their critical signification. Physical and psychical phenomena, it is true, appear as two sides or modes of representation of the same synthesis, that is, as combinations of the many and the one, but in such a manner that their difference is precisely marked in the character of this synthesis. Previously to this synthesis, that is, without knowledge, both things and souls, that is, both nature and individual consciousness, are out of the question. Only in experience, that is, only through knowledge, are things as yet undetermined converted into things determined, and this is true of the psychical as well as of the physical. The separation of objects and of individual consciousness is performed within consciousness itself. Thus the individual consciousness, or ego, is subject to the same law as nature; psychical and physical phenomena belong together. But consciousness is not exhausted in them; forms of consciousness remain which are not identified with natural evolution. Nature is only a part of consciousness, and like the psychical it too is content of consciousness. The psychical is distinguished from the physical simply by its being content of consciousness of an individual unit, the ego, whereas in the physical this content is determined by the objective nature of the system without regard for its possible simultaneous relation with the unity of the individual consciousness. Hence in the one case the content is *experienced*, in the other it is *known*, and the last is termed physical. In neither case are we concerned with a content which exists by itself, but the combination of the undetermined many into one initially gives rise to the content. Whether the latter receives a psychical or physical character, whether it becomes soul or thing, is contingent on the character of the content, and we have in our own body an instance of a psychically experienced content which is known at the same time as a physical content.

The term "parallelism," on the other hand, is not supposed to imply that the analogy prevailing between physical and psychical phenomena is a thoroughgoing one. The fact is, that where unity is presented in the psychical (as in subjective sensation and feeling), in the physical the process is extremely complicated; and where indeterminateness is met with in the psychical, in the physical

determinateness prevails. We cannot, accordingly, refute the theory of parallelism, by showing that no analogy prevails between the two aspects. In the psychical, for reasons which will be immediately discussed, determinative aspects of the world-content appear which are lacking to the physical, namely, all the aspects which reveal the situation of the individual as a separate unit opposed to nature, and which we experience as feelings and impulses. Special conditions must be satisfied ere the unity of a system, as determined by natural law, is so narrowed down and concentrated that it becomes conscious of itself as an individual mind. Direct experience presents this case only in the complex of our own organism. If the conditions of the aforesaid unity are not fulfilled, then the physical process is not experienced in that system and we call it an unconscious process because it is known to us only as a physical phenomenon. The unconscious or non-psychical, however, denotes nothing but separation from my individual consciousness, and not separation from the determinations of the content of a universal consciousness. Here forms of determination abide which rank above the phenomenal world, empirically known to us in individual minds; physical and psychical events in time and space may be conceived as the co-ordinated means, by which the free self-determination of persons is developed under the guidance of reason. In this way the critical view meets the requirements of scientific cognition by exhibiting nature both in physical and psychical respects as a necessary system determined by law, while it also preserves intact the freedom of persons.

IV. THE LAW OF THE THRESHOLD.

If, agreeably to the preceding remarks, psychical events also be installed as parts of the order of nature, it is incumbent upon us to clear up the peculiar difficulties which the individual mind offers on such a theory. Why is the ego experienced as an undetermined and vacillating unity, such as I know it in myself, a frail, perishable, and erring man? If psychical experience is a unit of the same kind as the physical system, but as observed so to speak merely within itself, why do I not experience *all* of nature, as it

actually is? You tell me it is the real moon which I receive into my ego in vision; consequently the whole universe must be contained in me, its laws must be clearly revealed to me, in me all life and action is, and I ought to be able to penetrate at a glance the secret of the world. Nature is a unitary coherent system determined by law; but I am ignorant of it. The movements of the atmosphere are determined by fixed relations obtaining between sun and earth, water and land; but the sailor on the storm-tossed ocean knows nothing of this necessary connexion; the result of the storm is undetermined for him, as is also his fortunate rescue in the harbor. Motions of bodies, waves of sound and light, are impinging incessantly on my body, but I notice them not, although they are certainly present. The physicist determines fractions of milligrammes with exactness, but I cannot tell by the mere weight whether you have placed one hundred or one hundred and ten grammes in my hand. The world goes its way but I sleep; or I strive hard and learn nothing. The physical unity remains preserved, the psychical does not. How is this relation of the individual ego to nature to be explained?

And further, if my individual consciousness is found to depend on nature, how am I to understand the attitude of the critical view which ascribes to personal consciousness a position above nature? Is it possible that there is a second consciousness in me besides my individual consciousness which is independent of nature? If this were so, we should have to surrender all that we have discovered to be conformable to law. Absolute anarchy would prevail in my ego, I could acknowledge in myself at will the law of nature or a power above nature. My individual ego, says the critical philosopher, is a parcel of nature, yet above it stands my free, self-determining personality. What can be the meaning of such a view? What is this personality if it be not my individual ego? What am I to understand by personality? What relation does my individual consciousness bear to this "personal" consciousness?

In the realm of natural science there are no persons, but only individuals. The natural scientist, therefore, has nothing to do with this last problem. Only when we propound the question of

the relations of natural science to ethics, æsthetics, and religion, does the notion of person enter. And to put this notion of personality, or, if we prefer it, the law of reason, in a clear light as contrasted with the law of nature which is implied in it, is the task of the critical theory of knowledge.

As regards our main theme, this task stands somewhat in the background; but we must at least make a passing reference to it. Here the great difficulty is encountered of clearly and popularly distinguishing, without undue use of technical language, the notions which, owing to insufficient abstraction, we are accustomed to associate with the words "self" or "ego" and "consciousness." Language takes her designations from direct experience, and although she gives to them metaphorical meanings when they are used to describe abstractions, yet the linguistic sense always discovers remnants of the original elements therein, which disguise or pervert the meaning of a thought. And not infrequently a suitable word is missing altogether. It may be true that often

"Where fails the comprehension

A word steps promptly in as deputy."¹

but in philosophy it is usually the reverse; the ideas are there, but the word cannot be found which expresses them succinctly and lucidly.

Thus there is wanting in familiar speech a common term for the physical and the psychical. I have used the phrase "content of consciousness." I might also have employed the word "appearance" or "phenomenon." But these terms are always subject to misconstruction. In the case of content of consciousness we are always prone to think of something subjective, of the content of some *individual* consciousness. It then seems as if we desired to make something psychical out of the physical, whereas we only wish to say that they signify or involve the same content, the latter differing only in the manner of its appearance in different unities. On the other hand, if we use the word "appearance" or its common Greek form "phenomenon," we are constantly subject, in us-

¹ "Faust, Part I., Scene IV.

ing this terminology of Kant, no matter how forcibly we may struggle against it, to the misconstruction or impression that we are speaking of *appearance* only, that the phenomenon is not what had actually happened, the actually existing thing, but its mere semblance or illusion. And after we have happily explained that phenomena are designed to describe not apparent but actual experiences, the obstinate opinion is awakened that there must still be something at the basis of the phenomena which appears in them. But that again is not our meaning. As was shown above, physical and psychical are not phenomenal forms of an unknown third thing, but they are reality itself in time and space. Hence we must avoid this term and try to get along with the simple word "content."

That which distinguishes one individual from another is solely his content. The beggar and the king, the dolt and the genius, the uneducated man and the scholar, any two persons whatsoever, are different simply because different contents form coherent unities in their egos. Not the attribute ego distinguishes individuals; on the contrary the attribute ego is precisely what they have in common; the beggar and the king, Tom, Dick, and Harry, all know and are conscious of themselves as egos. What makes them not the same ego is the possession of a different time-and-space-determined content. The one lives in the dirt and squalor of the streets, is barely successful in maintaining his existence, while the circle within which his wants are included is narrow and restricted. The other lives amid the gorgeous splendor of a palace; his richness of content fairly overwhelms him; far-reaching and enormous are the effects produced when changes take place in his consciousness. These are extreme examples of the difference of content of two individuals. It is characteristic of all men, however, that a definite configuration of things in space, called the bodily organism, is part of the content of the human ego, and that everything that is to become parcel of this content must fulfil the condition of being connected with this body and with its central nervous system. This organism, whose development we can trace back to systems of a very simple order, cells and protoplasm, represents the unity of the system which we immediately experience; while the totality of the

content thus brought into the proper relation for the purpose, is our experience, and is called, in so far as it is conceived as a unit experiencing itself, our individual mind. This ego, which is consequently nothing else than a content of definitely determined states in space and time, is a part of nature in which nature experiences itself.

But it is a part only. Thus we answer the question why we do not experience nature as a law-determined system of physical changes, but simply as a vacillating psychical phenomenon. As individuals, we are such a part of nature that only quite determinate and select changes are able to modify our content. It is well known that an excitation which strikes the ends of our nerves must have a certain strength to be perceived. The least limit which must be reached in order to produce a modification in the content of our ego, that is, a modification of the organic system accompanied by consciousness, is called the threshold of excitation. The threshold varies in magnitude for different sense-organs and for different excitations, as for sound, light, heat, pressure, etc., and it even varies with individuals and with their moods and conditions. Practice reduces the threshold of excitation, increases the sharpness of the senses. Fatigue raises the threshold, while sleep augments it to such a degree that only powerful stimuli are able to cross it and reach consciousness.

A stimulus is an exchange of energy between our environment and our nervous system. This exchange is objectively immeasurable, even when subjectively we are unable to perceive it. A drop of acid in a large quantity of water is chemically detectible long before it is perceptible to the sense of taste.

And in still another manner are we insensible to changes in our environment. If we compare two different stimuli, each of which alone is perceptible, for example, a pressure of thirty and of thirty-five grammes exerted on the palm of the hand, we shall not notice that the two stimuli are different. The difference between the two must reach a certain magnitude, in our example, some ten grammes, before we are aware that we are dealing with two different excitations. The least limit in this case is called the threshold of change

of excitation. It is generally proportional to the magnitude of the stimuli, so that for example, in order to perceive any increase in a pressure of three hundred grammes, the pressure must be augmented to four hundred grammes. These two experimental facts, the existence of the threshold of excitation and of the threshold of change of excitation, are together called the law of the threshold.

This law of the threshold is simply the scientific expression of the fact that we are individual minds ; in other words that the unit of which we have experience does not comprise the whole universe, but separates our ego as a distinct system from the law-determined totality of the world. Its upshot is that this special unit of which we have experience is merely a small and limited section of the total content of the world and can never comprise within itself all the relations of existence. It involves the condition, therefore, that our individual consciousness as a specific content is different from the universal determinateness of things which holds together the remotest parts of space and time ; and in this manner it marks out and characterises the real difference between the physical and the psychical. Psychical, that is, our individual experience, is that portion only of the world-content which passes the threshold, and since we know that there are changes of pressure, temperature, extension, motion, etc., which we do not perceive, all such changes are called physical in contrast to psychical.

In the physical world there is no threshold. The laws of the physical world can be expressed in mathematical equations. By means of the latter we calculate the interchange of energy between the different parts of space. The laws can be determined with accuracy which apply to indefinitely small differences. It is true in every actual case finite limits are set by the conditions of the problem beyond which the calculation does not hold because of the altered conditions of the problem. But so far as the mathematical character of the quantities are concerned, no such limits exist. Pressure, temperature, volume, energy itself, can be conceived with differences which decrease indefinitely. Take the acceleration of a falling body, the augmentation of the temperature or pressure of a gas ; mathematically considered such quantities are continuous,

that is, their laws still hold good, even if one of them be altered only by a vanishingly small fraction of a millimetre, degree, or milligramme. And so we assume that every change, no matter how slight, does, as a matter of fact, although inaccessible to observation, exercise its influence on all parts of the universe. Theoretically considered, the fall of a grain of sand raises its temperature, and the heat therefrom is radiated to the farthest nebulae of the heavens. This, in fact, is the meaning of the infinite, physically necessary connexion of the All.

But this is altered when the unity of the individual mind is taken into account. The individual mind is a system which, by the law of the threshold, is cut off as a finite unity from the infinite workings of the world. The extremely small rise in temperature, for example, which the moon produces, is physically determinable, yet no man is ever directly aware of it. Doubtless it has its effects upon our body as much as upon any other; but it is not present as sensation. Every exchange of energy between our body and its environment must produce some modification in the former. Viewed in this aspect, we term such a modification, as before said, a physical change. We call such only psychical which we experience as sensation. Therefore, a part only of the energy of our nervous system goes to form that unity which has experience of itself. This part is called psycho-physical energy. The phrase indicates that this energy is physical, but at the same time that it is a modified portion of the total energy of the system, viz., that which we psychically experience. We may assume that a peculiar structure of the central nervous system, as also of the sense-organs, conditions this limitation of sensation, which we call the law of the threshold.¹

It thus happens that we are finite minds which, as compared with a universal consciousness, have experience of fragments of the world only. In this manner our perception is restricted, more unsafe, and erring. In this manner the content which we term our ego, is undetermined. In this manner nature becomes an infinite

¹ Compare the author's paper on "Psycho-physical Energy and Its Factors," in the *Archiv für systematische Philosophie*, Vol. I.

problem for us, whose broad conformability to law we can never approach more than approximately. In this manner our subjective knowledge of nature is distinguished from objective conformability to law, which we presuppose in nature. But on this very fact, which shuts us off as finite minds from the universe, hinges our existence as conscious beings. The law of the threshold protects us against the constant and endless inundations of stimuli that flood the universe. In the structure of the organism they are gathered together into a law-determined system which by its very restrictedness is able to be preserved as a discrete unit, such as has been developed by the interaction of cosmic stimuli. In virtue of all these we are an ego, and recognise ourselves as such in contrast to nature.

Here, too, the difference between nature and individual mind as a mere difference of contents is emphasised. In nature we have a content in which each part is determined by all the relations which it bears to all the other parts. The moon is determined by all its relations to the earth and to all the heavenly bodies, and by its relations to its own parts (that is, in its chemical and physical composition), and by its relations to all nervous systems wherever and however existing; and so forth. Thus the moon is exhaustively and necessarily determined, and that is objective nature. On the other hand, we have in our ego a content which is determined solely by a limited number of relations, namely, by such possibilities of interchange of energy as pass the threshold of this particular nervous system of mine; and thus this ego is not exhaustively determined, and thus it remains subjective experience, appurtenant to me especially, and subject to untold contingencies.

V. THE FEELING OF FREEDOM.

We have repeatedly stated that "the experiencing of a thing," in which we are accustomed to see the difference between mind and body, is merely a difference in the character of the compounded content, but induces no modification whatsoever in the real essence of the content. This fact must be borne in mind if we wish to understand the critical view. The fact of a given content forming a unit with our nervous system is identical with the fact of its being expe-

rienced; no other change is effected, so far as the space-and-time-determined condition is concerned; that bright, round object in space remains that bright, round object in space. However, a new attribute is imposed on the content, due to its forming a unit. The unity involved in this content belonging to my ego and not to another, is experienced along with the multiplicity of the content. This attribute which we experience only in ourselves is *feeling*.

By feeling we understand the consciousness of possessing a given individual content or of *being* such. The content itself in its aspect of multiplicity we call *sensations*. These, however, unlike feeling, are not merely the referring of things to the unity of the ego, but are determinative states in space and time. Bright things, smooth, heavy, warm, and sweet things have always a definite location, and are hence objective; only in so far as this location and its quality are parcel of the content of my ego, are they also subjective and specially referred to one another as *my* content. And in this unity they are experienced as mutually determinative. Herein lies the feeling of pleasure or pain. Feeling, consequently, is that by which I am distinguished from other individuals and from nature. For this new unity to which my nervous system belongs exists only once. And because precisely I am this unity, it is for me the starting-point of all existence; it is that by which I know that I am; and consequently it is that which gives *value* to existence generally.

In feeling we have the direct relation to one another of determinative states of content, which we experience in ourselves as pleasure or pain; but we are always conscious of them as connected with changes in the content. But whether a definite change of content is associated with pleasure or pain for us, depends entirely on the character and present mode of determination of the ego-content in which the change is effected. The odor of roast beef is pleasurable to a hungry man, but painful to one who has thoroughly satisfied his appetite. Moonlight fills us with pleasure during a walk at night, but it may be that in some cases we should prefer darkness. Yet the odor of roast beef remains a definite quality and moonlight likewise remains a definite quality, to be found by nat-

ural laws in a given place at a given time. By natural law my organs of sense are also in a given place at a given time; by natural laws the same sensations are experienced; and by natural laws these sensations mingle with the entire remaining part of the content of my ego and give rise to a unity which, conformably to natural law, I experience according to its constitution as pleasure or pain. Hence this feeling also is *determined* from the point of view of nature, but only as regards the last-mentioned *infinite* system. It is *undetermined*, because undeterminable, for every *finite* system; seeing that it is impossible to know the exact state of things at which the new content meets the old. And so, through feeling, we experience immediately that indeterminateness of systems which is conditioned by the law of the threshold. Accordingly feeling is the infallible sign that a given content is part of our ego. But this is an experience of an entirely different sort from considering this content under the point of view of knowledge. In the last case the connexion is theoretically determined, that is, every content is conditioned by another and is necessary as regards the whole of knowledge, but always presupposes as the condition of its existence a second preceding content. In feeling, on the contrary, the content is directly experienced as unconditioned, and so is not determined by law, although absolutely certain in itself.

On the other hand, if we consider a system, be it the moon, our own body, or that special content which we call our ego, not as directly experienced, but in its broad connexion with nature, then we are no longer concerned with feeling; the unity which now determines the connexion is the unity of law, wholly without regard to whether it is experienced or not experienced by any system. It is the inevitable consequence of the scientific mode of view that it excludes feeling from the systems investigated by it. Hence result its determinative rules regarding nature in consequence of which as compared with the individual mind it appears to be something external. As we have seen, however, this contrast, so far as regards the content of nature, is not justified. The same qualities which form our ego are likewise those that are present in nature; we simply abstract from the fact that they are associated with feelings.

As before, the objection is invalid that in nature we have ethereal vibrations and energy, while in me there are light and brightness. In fact we have overturned this objection; the two are in me and in nature at once. What is it that is bright? Not my eye, my retina, nor my *corpora quadrigemina*, but that spot in space. Not the sensation that here there is something round, red, white, and fragrant which we call a rose—not these qualities are subjective, but only the feeling associated with them, that the content which I call my ego at any and every moment has suffered alteration in the manner described. Sensation is objective in so far as actual relations make their appearance at this definite spot of space, which bear in them the determinative conditions of round, red, white, and fragrant. But it is always tacitly involved in the assumption of these determinative conditions that they never reach their complete stage as qualities until they are brought into connexion with the sensory organs and the brain of a human being, that is to say, unless certain processes in the nervous system take place at the same time.

Owing to this limitation, qualities have been termed subjective. Yet their reality is evidently assured even without and previously to connexion with the nervous system; only the attribute of being experienced is then lacking. This reality, independently of the nervous system, is also exhibited in various other connexions, as for example, in the biological, with the development of the stem of the rose, in physics and chemistry as a body of such and such weight, and such and such constitution; in this last connexion with physical knowledge, it is defined as a structure of spatially determined quantities of energy. Since here all reference to the nervous system is omitted, whilst with the expressions "red" or "white" that reference is implied, the first reality is termed objective, or body, and the second is called specifically sensation. And owing to the contrast involved, sensation is termed subjective. But obviously it is as much objective as the connexions wherein energy is concerned, and is differenced therefrom solely by the fact that the latter distinguish the body "rose" as the system "rose-nature," whilst sensation, although also characterising the body "rose," marks it out as the system "rose-brain." All is a difference of content.

In the system rose-brain, the rose is experienced : the qualities red, fragrant, etc., are associated in time and space with the feeling which marks our ego as a unit. In the system rose-nature this is not the case, but there exist here the absolute conditions determining the rose as an objective body unrestricted by the law of the threshold. Sensation, however, still persists among the attributes that mark out this particular spot of space as a rose, and only its sentient aspect is missing. The law-determined connexion of qualities still endures. Yet, inasmuch as the mere assignment of quality is not sufficient for determining the parts of space in their natural connexions, physical science has resolved them into determining conditions of mainly a quantitative kind. Yet it must not be thought that on this account qualitative states have less objective reality than quantitative states ; they merely, but always, signalise some possible reference to a human ego, and are consequently not determinable with sufficient distinctness by themselves.

When the same part of space is determined on the one hand (psychically) as "red," and on the other hand (physically) as an ether-vibration of 0.00007 cm. wave-length, we are not concerned with two different processes wherein the ether-vibrations are transformed in the brain into the sensation red, but merely with two different relations of the same fact. "Red" marks the relation in which the given spot in space stands to the content of an ego when the necessary connexion is established with the human brain ; the vibration of the ether, on the other hand, denotes the relation in which the same spot in space stands at that moment to every other spot in space without reference to a human brain. This last relation as a mathematical determining rule is alone able to assign exact and determinate data regarding the condition of the aforesaid spot in space at the moment in question. The relation characterised by "red" does not destroy the objectivity of the state considered, but suffers it to be connected with the system called the ego, as a state of the same, which from being an individual mind is always undetermined. Hence, a scientific theory of colors was not reached until it was learned to determine colors quantitatively. But it should not be forgotten in this connexion that the character of the colored spot in

space has not been changed, and that it is unnecessary for the red to be produced by the vibration of the ether. Quite the contrary, the vibration of the ether is simply a means of defining a given spot of space as it exists under given conditions, without being obliged to take account of its special relations with a human brain.

It is, in fact, the very problem of science so to define the single contents subjectively made conscious to us in sensation, that they shall hold good and be subject to determined law as objective contents. In so doing, we do not destroy the element of sensation, we merely make ourselves independent of its connexion with feeling. When we have succeeded in defining all sensations in terms of the interchange of energy between parts of space, or, as mechanical physics strives to do, in terms of the motions of atoms, then the ideal has been reached of ascertaining changes in space without resorting to their nature as experienced in the ego. In fact, this would be a perfect ideal of natural science, for if achieved all subjective indeterminateness would be excluded. In the case of colors and sounds objective definition of this sort has been accomplished. If, now, we attempt to revert from our physical determinations as thus made, to the qualities originally sensed, it is obviously quite redundant to ask how sensation could have been generated in the brain by mechanical processes, because the mechanical processes themselves are merely the analytic product of what was originally given as sensation in such and such a spot of space and at such and such a point of time.

The further the process of objective definition is carried in science, the more distinctly the mechanism of nature is separated from the indeterminable system whose content is experienced in feeling only. In fact, the growth of science has shown that a remnant is always left over in the ego which is incapable of being resolved in the fixed terms of natural science. We have seen how, in the human organism, by the law of the threshold, a content has been marked off within nature which actually cannot be determined—namely, the individual mind, which is called an ego. But even this indeterminableness is itself nothing more than a fact; were it possible to see to the bottom of all the relations of this content, then

the whole content of an individual mind would be determined. However, this possibility is never realised.

By my having laid stress on indeterminateness as the attribute by which the psychical content of our ego is distinguished from the physical, and by my having called the individual mind in a scientific sense an undetermined system, the reader will perhaps entertain the suspicion that I have been endeavoring, on the strength of this indeterminateness of individual psychical things, to open up a back door by which to smuggle freedom of will into the necessity of nature. But this is far from my purpose and would be tantamount to a lapse into dogmatism. In nature, and hence in the individual empirical mind, there is no freedom. The individual is merely a piece of nature, and to attribute freedom to it would be equivalent to destroying nature.

Yet one gain we have made—we have explained why, despite the fact that the determinateness of nature prevails in the individual mind, we have yet the *feeling of freedom* therein. Natural necessity is assumed to assure the existence of units in time and space, and we know consciousness simply as such an experienced content in time and space. It may be called the empiric content. We are not, however, able to point out everywhere in this content of our ego the necessity of nature. And yet the ego-consciousness persists. In our empiric consciousness, therefore, natural necessity is implied as the pre-condition of the existence of our individual mind, yet only in so far as we recognise ourselves as an individual in the general connexion of nature; in other words, this necessity is the *theoretical* condition of our individual existence. Practically, however, these conditions are never perfect. If we were referred for our existence to natural necessity, if we had to demonstrate theoretically our individual existence, this latter would always remain open to question; there is no expedient for proving from natural laws that we exist because every law presumes new conditions and so reaches back indefinitely far.

Fortunately, we are never under the necessity of proving our existence to any one, as it is sufficiently assured us through consciousness—not through theoretical consciousness, but through ex-

perience. The psychological form of consciousness in which our existence is immediately known is feeling. Feeling, therefore, is a form of existence in which our individual mind is free from its determinateness by natural law. For from the point of view of nature, that is, on the ground of theoretical knowledge, infinite conditions must be fulfilled before our existence is assured; but in feeling it is assured without all those conditions being fulfilled. It is true, we do not know from this source *how* we exist, but it is simply brought to our knowledge *that* we exist. We have experience of a content without having to wait to have knowledge of it. If we make feeling itself the object of knowledge, it is necessarily determined by this fact itself; if we ask, for example, why we now have just this feeling, fear, or joy, we find that the content in question is joined with natural conditions. But the ascertaining of these conditions is not experienced; in my ego it is not present—at least, it is not present for feeling—and hence I *feel* myself free.

In other words, although theoretically I am only relatively determined as an individual, because the infinite conditions of my existence in space and time are never completely achieved, yet I find in feeling determinative grounds going to prove my existence, which are of absolute validity. Feeling, accordingly, is the sign that I am not only dependent on nature in my theoretical determination, but possess a practical determination. The determinations of consciousness are not exhausted in my empirical consciousness, but such only as are appurtenant to knowledge in space and time. Natural necessity determines *how* we must exist *if* something else exists, and again, what conditions must be fulfilled to this end, and so on *ad infinitum*; in so far it is the supposition of our existence. But it has itself a presupposition, namely, consciousness. It presupposes that consciousness exists, that there are determinative states and synthesis, and then only does it explain that our individual consciousness must be so and so, and has this or that content. It cannot, however, be theoretically shown that this presupposition is fulfilled, but we are certain of it by feeling.

There is therefore a synthesis, the self-feeling of our ego, which is itself the presupposition of nature and therefore the presupposi-

tion of our individual existence. It is to be carefully noted that no such vicious circle as the following is involved: the ego conditions nature, and nature conditions the ego. The first ego, the self-feeling ego, and the second ego, the ego conditioned by nature, are two different things. The ego conditioned by nature is our individual existence in space and time which as shown above is determined solely by its content. But the ego as self-feeling is that universal ego which is alike parcel of all individual egos however differing in their content. The empiric content only is determined by natural law, but egoness as such is an autonomous determination in consciousness whereby the determination of content (that is, of the one from the many), and hence nature, are originally possible. It affirms that individuals *shall* be; but individuals can be real only in content, in nature, in space, and in time.

Thus feeling exhibits natural necessity as a means, the object of which is the ego itself. It shows that although everything which we experience in space and time is necessarily determined as content, yet the experiencing ego as the determining unity therein is not resolved but refers its finite conditionedness to something unconditioned. Not that we could have experience of something that is not necessarily determined in nature; but our *having* experience of anything at all must repose on foundations not embraced in the necessity of nature. Otherwise it would not be intelligible how we could exist as experiencing beings and be absolutely sure of this existence, whilst yet natural necessity is never given with all its infinite conditions in the empirical consciousness.

Our existence, accordingly, must repose upon a law which is independent of the natural law that determines the content of our experience. For in determining *that* we exist, the law anticipates the aim sought, as to how we must exist. Such a law which prescribes the direction in which our experience has to develop is called an *idea*.

As the idea assigns the point of view under which experience is originally possible, it is, as accords with its character, never fulfilled. But the feeling of self is a sign that we ourselves represent such a unity in which the conformability to law that is never ac-

complished in experience is made conscious as a condition which is bound to be perfect. Such a unity which absorbs the law with the consciousness of carrying it to completion in itself is called a personality.

As a consequence of the limitations due to the law of the threshold we are individual minds, and as such, parts of nature. Yet as we grow conscious of this limitation and are still cognisant of our ego as the object for the sake of which the natural necessity controlling our individual existence is embodied in the unity of our ego, we lift ourselves above the limitations imposed by nature. We know ourselves as the unity in which an idea is being realised, to which nature is subservient as a means, and which consequently is itself determined by nothing else. This very personality has no beginning and no death, and no place in space; for time and space and the individual development of consciousness thereby conditioned exist for the self-ends of personality. Personality for this reason is never met with in the empirical realm, except in the personal belief in the reality of ethical, æsthetical, and religious self-determination of humanity.

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THE NATURE OF PLEASURE AND PAIN.

GENIUS, which Schopenhauer regards as a state of mind that is ill adapted to the world, is classed by Lombroso in the same category with crime and insanity; while Griesinger denies that there is any reliable criterion of sanity, declaring that the question whether, or not a man be insane is "in many cases absolutely devoid of meaning." Because "the organism is constantly oscillating in its functions," Claude Bernard argues that the normal state, being an ideal form which is never fully realised, is "a pure fiction of the mind."

These views apparently result from philosophical premises which are tacitly assumed, and it would be difficult to trace or define them in each case; but this much seems sure that they exhibit a neglect either of the importance or the actuality of form. Schopenhauer regards form as purely subjective, or, as he calls it, "ideal"; to him the objective world is devoid of time, space, and causality, or, in a word, devoid of form of any kind. Claude Bernard and Griesinger are probably, like so many naturalists, under the sway of the old nominalistic philosophy which views the world as a chaos of innumerable particulars and, denying the objective reality of formal relations, considers universals not as a description of *things as things are* but as mere mental fictions invented for the convenience of classification.

In opposition to the nominalistic mode of thinking, we propose a philosophy that emphasises the objective reality and the importance of form. The terms "matter" and "energy" are symbols denoting certain invariable constants, and cognition is ultimately always a tracing of form and formal law. Counting, measuring, and delineating the effect of configurations are the methods of science.

Thus the philosophy of form is the philosophy of science; it is a new Positivism explaining the methods of science and deriving them from the formal elements of the facts of experience. If form were purely ideal and subjective, the objective world could never be explained, things would be unknowable and the ideal of science could never be realised—in a word, philosophy would be bankrupt and agnosticism alone would be the right world-conception.

From our standpoint the solution of all scientific problems must be expected from a consideration of form, and we are inclined to predict failure whenever on any account form is left out. Thus sanity and insanity must be regarded as a problem of relation. Sane is he whose mental images picture reality correctly. The question is a case of similitude and proportion. Truth is sanity; untruth, if established as a permanent habit, is insanity.

Genius is the disposition of an exceptionally normal mind,—of a mind which at least in one domain reaches an unusual degree of perfection. It frequently happens that a man's excellency in one line is accompanied by many drawbacks and shortcomings in other lines; and as a bright child is easily spoiled, so a genius will be suffered to indulge in many eccentricities. But let us remember that perfection of some kind, whatever it be, and not abnormal deficiencies nor whims ever constitute the nature of genius.

Schopenhauer fosters a concealed dualism in his system, so that to him moral actions, the ideals of art, and love of truth, appear out of place in this worst of all possible worlds in which we live. He regards the normal man who is adapted to the conditions of life as a brute, and both the genius and the noble-minded man as abnormal.

Lombroso seems to take his stand upon the principle that normality must be identified with the average type. The greatest number of individuals is decisive in the determination of the character of a whole species. Thus genius being a rare instance is as much abnormal as disease and crime. While genius ought to be regarded as an exceptionally perfect instance of the characteristic features of a type, Lombroso and his school class it together with all extremes in the category of abnormal conditions, which thus becomes a heterogeneous collection of all the cases that do not belong to the average.

This mode of classification omits considering the value of each single form and lays too much stress upon counting the number of individuals. There is a streak of nominalism in it which is analogous to the political superstition that questions of right or wrong can be decided by a majority vote.

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After these introductory remarks we are prepared to estimate the importance of form in a consideration of the pathology of pleasure and pain, which was discussed in the last number of *The Monist* by one of the ablest and most judicious psychologists of to-day, nay, of all times, Prof. Theodule Ribot.

Professor Ribot follows Féré in his determination of morbidity in emotional states, which, he says, is produced in three ways: (1) by extraordinary intensity, (2) by the lack of a sufficient determining cause, and (3) by undue prolongation.

The first and third point, which play the most conspicuous part in Professor Ribot's explanations, give the impression that his determination of morbidity is throughout quantitative, since it consists always in "too much or too little," be it in intensity or duration.

Either Professor Ribot fails to discuss the second point or I cannot discover a clear exposition of it, except perhaps where one of Dr. Dumas's patients is mentioned as attributing "her incurable despondency in turns and without sufficient reason to her husband, to her son, or to the work which she feared she was neglecting." However, this condition, as all cases of a similar kind, are not instances "without a sufficient determining cause," but examples in which the patient attempts to justify his or her melancholia by presenting all kinds of fictitious causes. Otherwise, the second point, too, seems to be quantitative; for it is characterised as a "disproportion between the cause and the effect felt"; as, for instance, "a patient suffering from nostalgia thinks only of his country or home, and those afflicted with religious melancholia only of their salvation." This would mean that disorder is caused by the undue prominence of one emotion which thus dominates the whole economy of a man's psychic life.

No objection can be made to the proposition that every "too much" and every "too little," be it in intensity, duration, or in disproportionate effectiveness, will result in a morbidity of the emotional conditions; but the more important factor that produces mental diseases is not the quantity or partial preponderance of certain phases of emotional life, but its quality; it is error, illusion, or, generally speaking, the non-congruence of a representation with the things or conditions represented. Of course, error as such is not as yet a disease or alienation, but it produces a morbid state of mind as soon as it becomes constitutional; that is to say, a fixed determinant for action, developing an incurably wrong habit which naturally will appear as a fixed idea.

The quality of our ideas as well as of the reactions that take place in response to the various stimuli of the surrounding world are more important than their intensity; because their adequate or inadequate relation to reality constitutes the basic and most important criterion of sanity and morbidity; and when speaking of quality the expression "too much" has no application. Here it becomes apparent that as there can be no disease which consists in "excess of health" (an expression used by Professor Ribot), so genius cannot be abnormal on account of possessing too much of the normal. Can an image be wrong because it is extraordinarily faithful to the original, or can a proposition be false because it is too true?

Pleasure and pain are treated by Professor Ribot in the same way as sanity and insanity. Pleasure is looked upon as an increase, pain as a decrease, of vitality; and Professor Ribot by no means stands alone in his view. Indeed, almost all psychologists are in the habit of accepting without argument the traditional definitions which identify pleasure with growth, health, expenditure of energy, or beneficial actions; and pain with decay, dissolution, abatement of vitality, or harmful actions. If pleasure were indeed identical with growth and health, and pain with decay and disease, how could we speak of the pathology of pleasure and pain? All pleasures would be healthy, all pains symptoms of morbidity. Yet this is not so! The fact that pathological pleasures exist stands in contradiction to Professor Ribot's definition of pleasure, and, when writing on the

pathology of pleasures, he feels under obligation to justify the term and to escape the reproach of inconsistency by saying :

"If we admit that pleasure and pain always exist by virtue of simultaneous and contrary processes, of which the sole difference exists in consciousness, it is sufficient if one of the two processes augments or the other diminishes abnormally, for the difference also to alter in favor of the one or the other."

He adds :

"Unquestionably, the ultimate result is a contradiction of the rule, because in the cases considered the surplus which should be negative (pain) is positive (pleasure)."

Would it not be advisable to abandon for good the theory that pain is negative and pleasure positive? Nor would it do, with Schopenhauer, simply to reverse the statement and regard pleasure as negative and pain as positive. For it is not the relation of quantities alone which determines pleasurable or painfulness of feelings, but the peculiarity of their forms also.

The old conception of pleasure as growth, or as positive and beneficial, and of pain as decay, or as negative and destructive, is generally adhered to, in spite of the concessions frequently made, that many morbid states produce pleasant emotions ; that growth is sometimes a painful process ; that dissolution in death is, when the death-agony has been overcome, as painless as falling asleep ; that rest is as much a pleasure as exercise ; that healthy exercise appears disagreeable to those not accustomed to it. Pleasures as much as pains are both positive and negative ; and what is pleasurable to one is painful to others. Under these circumstances a revision of our conception of pleasure and pain would be advisable, and we venture here to submit in outline a new theory of pleasure and pain that would be free of the inconsistencies and contradictions of the old view.

Pleasure and pain are feelings, or subjective states ; they are the psychical accompaniments of physiological processes, and whether a physiological commotion will be pleasurable or painful apparently depends upon the relation which the commotion bears to the structure in which it takes place. Every commotion leaves a definite trace in the living substance, forming a disposition which

when stimulated revives the feeling that accompanied the original commotion. The repetition of the physiological act means the revival of its analogous psychical state ; and the preservation of peculiar forms of commotion is the condition of memory.

Pleasure and pain presuppose the presence of definite structures or dispositions in living substance, and therefore it seems plausible that the first commotions which determine the aboriginal and initial modes of life, ought to be neither pleasurable nor painful, but simply unconscious. Feelings when absolutely isolated are no feelings. A feeling must *be felt* to be a feeling. For feelings to arise, there must be an interaction between two or several sentient commotions. The new commotion must meet and revive the memory-image that ensouls the trace left by former commotions. Thus the feeling of pleasure and pain depends upon memory, and memory is due to organisation.

Now, a vivid commotion either may or may not be of the same kind as former commotions ; it will either fit the structure, or disturb it, by jarring the trace previously formed. The former may be regarded as representing the primitive condition of pleasure, the latter of pain, while a commotion that is not vivid because it is neither intense nor accompanied with attention sinks into the realm of indifferent states.

Structures built up by a constant repetition of commotions of a certain kind constitute organs ; and the activity of organs, which naturally depends upon their structure, is called function. According to the theory of evolution, we regard the whole organism as the product of inherited and acquired functions, built up in the course of ages. The functions of an organism having arisen in response to definite and constantly repeated stimuli, attend to the various needs or demands of life, and pleasure appears to be nothing more nor less than the gratification of some want, while pain is due to a disturbance of some kind. But in the measure that the satisfaction of a want becomes a matter of mere habit and is automatically performed without receiving any special attention or concentrated interest of the whole organism, it sinks down into the realm of indifferent or even subconscious activities.

The character of the various emotions depends upon the constitution and habits of a being ; and there may be pathological pleasures as well as pains. The wants to which a creature, either by heredity or education, has become accustomed, be they natural, unnatural, artificial, or even vicious, constitute the conditions of its pleasurable emotions, and the intensity of a pleasure will be in proportion to the intensity of either the want or its gratification, or both. Pains are either wants unsatisfied or other disturbances perceived by consciousness. Growth as well as decay may produce disturbances, and both accordingly may become causes of pain.

From this standpoint all difficulties disappear. It is apparent that teething, although it is a growth, will not be a pleasure to babes. Eating is one of the commonest pleasures, because it is the satisfaction of one of the commonest needs, and its pleasures depend upon the structures of the papillæ of the tongue and other organs ; yet is eating no growth, no expenditure of energy, nor can it be identified with digestion. Digestion is the first stage in the assimilation of food ; but eating is simply chewing and swallowing ; the act of eating is not growth, not building up ; and the bitterest medicine may be more wholesome than the daintiest tidbit.

Sexual intercourse is in the same predicament ; it is the gratification of a craving that develops in the race, through the need of preserving the race ; yet is it in itself no growth ; the growth consequent upon it is gestation, and gestation is never counted among extraordinary pleasures ; it ought to be the height of human happiness in the opinion of those who identify pleasure and growth.

It is obvious that both pleasures and pains may be morbid or salutary. Every disturbance producing a reaction that will strengthen the system and increase its power, however disagreeable it may be at first, is wholesome ; while every pleasure that weakens the character must be regarded as morbid. It happens that in the life of nations and in the evolution of mankind the disturbances of great calamities prove spurs to progress. The throes that accompany the birth of a grander civilisation are often bitterly painful. Pain appears to be the condition of progress, and is frequently also its result. On the other hand, great inventions and new discoveries

in their turn, too, necessitate readjustments in the constitution of society, which are accompanied by convulsions.

When some people take pleasure in pain, when they delight in the luxury of grief and glory in their own misery, it proves only that they are possessed of a peculiar constitution. They have accustomed themselves to certain afflictions and adapt themselves to their surroundings. There are pessimists who regard sorrow as the normal and necessary condition of the world-order, and in their opinion, the emotion of world-pain agrees with the facts of life; or, as Bouillier puts it, "best accords with the situation."

Professor Ribot rejects Bouillier's explanation and prefers that of Hamilton, who finds the principal cause of the pleasure that is felt in "the superaddition of activity which the feeling of our sufferings imparts to our whole being." This theory, however, is very artificial and appears to be devised simply to suit the hypothesis which identifies pleasure with increase of activity. Hamilton seeks for a quantitative, instead of a qualitative explanation, and expects to find it in "a too much" where we ought to consider the form of a commotion in its relation to a peculiar psychical disposition.

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Professor Ribot does not enter into the moral applications of the psychological problem; but since they are very important, a few comments on the subject may not be out of place.

Those who identify pleasure with growth and healthy activity are apt to jump at the conclusion that pleasure is the aim of life and that the pursuit of happiness is the highest principle of ethics. They forget that pleasure is relative, since it depends upon the constitutions of people, and there is by no means an agreement about that which is and that which is not pleasurable. A glass of wine, or a smoke, may delight one man while it is an abomination to another. Therefore, to base ethics upon the pursuit of pleasure or happiness is about as unmeaning and impracticable as to base the estimate of the value of a new idea solely upon the imagination of its inventor. Standards for estimating values must be objective, and not purely subjective. Pleasure is a purely subjective state which is condi-

tioned by the systems and habits of sentient beings. Instead of making pleasure the ultimate aim and standard of ethics, the moral teacher must tell us what kind of habits will tend to build up character and add to the powers of the mind; and thus we shall learn not to strive for pleasure in general, but only for those pleasures which would be congenial to noble-minded souls.

Feeling that Bentham's egotistic hedonism was crude and offensive, Mr. Spencer changed it into an altruistic hedonism by proposing that the greatest amount of pleasure of the greatest number is to be regarded as the aim of ethics. This may be less offensive, but it is at the same time less logical, for if pleasure remains the aim of ethics, we cannot see why a man shall, under certain circumstances, sacrifice his pleasure, the conditions of which he knows, for the pleasures of others whose needs he can only guess. Here again, as in so many other problems, the error rises by considering quantity and not quality. The worth of pleasure and its dignity depend as little upon its amount or intensity, or on the number of those who enjoy it, as the verity of a truth can be ascertained by a majority-vote.

But then, is it not nobler to aspire for the pleasure of others than for those of oneself? Certainly, altruistic hedonism is morally higher than egotistic hedonism, but as an ethical theory both are equally wrong; for ethics introduces a criterion for judging about the worth of actions irrespective of pleasure and pain. Otherwise the arrangement of a dancing-party would be more moral than strictness in the performance of some trifling duty. If, after all, pleasure were to be regarded as the purpose of life, we ought to educate ourselves to such wants as are noble and elevating, such as widen the range of our soul-life, and make man greater, more powerful, and kinder. Before we make happiness the aim of life, we must let ethics so educate us that the most imperative want of our soul and our greatest delight will be the performance of our duties. In that case, however, not the sum or the amount of pleasure would have to be considered as ethical, but the kind of pleasure, which is tantamount to a surrender of the principle of hedonism that pleasure as such is a criterion of moral worth.

Professor Ribot repeats the common saying that "every animal seeks pleasure and avoids pain"; but let me add that the statement is not correct. Animals act according to their constitution which is a matter of adaptation to circumstances, natural selection, or education. The fighting-cock fights not because fighting gives him pleasure but on account of the peculiar disposition of his mind. He cannot help accepting a challenge even where defeat, wounds, and bitter pains, possibly death are the inevitable penalty; and there are men, nay, whole nations whose actions are determined not by the pleasure of actions nor by any consideration of consequent pleasures, but simply by the nature of their motor ideas. They are like powder, which ignites, not because it takes pleasure in the act, but because it is combustible. Then again there is a great number of men who deliberately seek pleasure and avoid pain, but the higher man, the moral man, the man of character, although he too finds pleasure sweet, and pain disagreeable, will, in all important decisions, not consult either his fear of pain or his desire for happiness, but act according to his conceptions of right and wrong. He will exhibit no hunger after pleasure; nor will he shun those pains that are inevitable in the pursuit of a higher and nobler life.

When hedonists define "right" as that which gives the greatest amount of pleasure to the greatest number, they are guilty of a confusion of heterogeneous ideas. By applying the same logic to another field, we might as well say that "truth" is that which seems most plausible to the greatest number of people.

Prof. Alexander Bain, who with the weight of his great authority supports the old view of pleasure and pain, says: "Inasmuch as we follow pleasure and avoid pain, if pleasure were injurious and pain wholesome, we should soon incur entire shipwreck of our vitality," but he finds it necessary to add, "as we often partially do, through certain tendencies that are exceptional to the general law." Is not one exception sufficient to upset the whole theory? And in the present case we have plenty of exceptions; for, indeed, *most* shipwrecks in life (perhaps all which are not caused by accident) occur because people follow pleasure and avoid pain. And is it not for

that reason that morals are preached? The man whose maxim is to seek pleasure and to avoid pain is sure to go to the wall.

The demands of reality are stern and care little about our sentiments. The problem of life does not centre in what we feel, but in what we do. The idea of adapting our actions to suit our sentiments is a wrong policy; for, on the contrary, we must adapt our sentiments to the needs of life, which prescribe upon the whole a pretty definite line of conduct called duty.

Man can become a higher being only when he ceases to be swayed by his feelings and becomes master of pleasure and pain. The mastery over pleasure and pain is the basis of any permanent and well-deserved success in life; it is the stamp of dignity that moral actions bear; it is the indispensable condition of a great man's greatness.

EDITOR.

LITERARY CORRESPONDENCE.

FRANCE.

IN a former letter I offered a comparison between the classifications of character given by M. M. Bernard Pérez, Ribot, and Paulhan. To-day we have the classification of M. A. FOUILLÉE in a book entitled *Tempérament et caractère selon les individus, les sexes et les races*—an excellent work, in the perusal of which, I hasten to say, I have taken much pleasure. M. Fouillée differs from his predecessors in three points: first, he introduces the idea of evolution into the study of character; secondly, he applies a recent physiological theory to the study of temperament; thirdly, he finds in mind the essential factor of character, and, in a broad sense, distinguishes between character proper, which he places at the top, and moral temperament, *naturel*, which he places at the foundation.

We shall now attempt to sketch the development of his thought and indicate some of the criticisms which his system evokes.

Character, according to M. Fouillée, "is the general direction taken by the will,—that which causes the will to react in a distinctive manner to every class of impressions, motives, and impulses." But our willed reactions repose on a primitive foundation, and that foundation—the *innermost character* of the individual—is made up of successive strata, race, sex, and lastly, the distinctive temperament of the individual. In brief, acquired character is developed upon a congenital groundwork, upon a groundwork of tendencies which express the general habitude of life of the organism, plus certain traits which express the relative value of this or that particular organ; and this congenital groundwork entire is the *temperament*.

M. Fouillée studies temperament from the point of view of the theory of protoplasm formulated in the work of Geddes and Thomson, *The Evolution of Sex*. These physiologists, as all know, explain the elementary phenomena of life as "constructive changes (anabolism) and destructive changes (catabolism) of living matter." Now these two series of changes may combine differently, so as to produce structures and functions variously specialised in living creatures, both vegetable and animal. According to M. Fouillée, the manner and the proportion of these destructive changes in the functioning of the organism produces temperament, which, in contradistinction to what is usually called constitution, is the dynamic characteristic of the individual. If we were to pass at once to the classification of the temperaments, we should have to consider the reciprocal relations of integration and disintegration in the organism generally and in the nervous system in particular. We should have thus, saving temperaments and wasting temperaments: a *sensitive* type and an *active* type. Each of these is then again subdivided on the same principle, not only by using the dominant direction of the vital operations, but also by recourse to the intensity and rapidity with which they are accomplished. Whence result the sensitive type of prompt reaction (the lively sanguinary) or of intense reaction (nervous), the active type of prompt and intense reaction (choleric) or of a sluggish or non-intense reaction (phlegmatic).

The whole difficulty is to pass correctly from the abstract consideration of anabolic and catabolic processes to the concrete consideration of types. Now M. Fouillée, who is perhaps right as regards the principle of his theory, is here less fortunate, and when he endeavors to deduce traits of visage and of character from nutritive changes, we feel that he is guessing rather than demonstrating, and evinces more ingenuity than exactness. But it will not be difficult to absolve him; the essential thing was to have taken up the right threads of investigation.

So far, however, we have had only types of temperament. Types of character may be obtained, M. Fouillée tells us, by the introduction of the factor of intelligence. Although his predecessors

did not entirely neglect mind in their classifications, he accords to it a far more prominent rôle than they, as being the power which enables us to react and to modify the very expression of our temperament. He does not think that this factor is merely derived and secondary, or superadded,—particularly in man: he discovers a distinct germ of it in that discernment which even the lowest organisms exhibit, and without which the relations of every creature to its external environment would be impossible. The three grand psychical functions in his system are: sensation, emotion, and desire. Their reciprocal relations give us the types of character. What is really and essentially at the basis of character is the predominance, first, of sensibility, of intelligence, or of will; and secondly, of this or that sensibility, of this or that form of intelligence. The "systematic association of tendencies" on which M. Paulhan takes his stand cannot but depend on the aforementioned relation of the primordial psychical elements, which is alone able to explain it and give body to descriptions.

M. Ribot has distinguished between *suffering* and *acting*. According to M. Fouillée these two categories apply only to temperament. Consequently, he has recourse to intelligence, and obtains three grand categories of character: the *sensitive*, the *intellectual*, and the *voluntary*. Their subdivision into classes gives us, for the first category, sensitive characters having (1) little intelligence and little will, (2) voluntary energy but little intelligence, (3) little will but much intelligence; for the second category, intellectual characters, we get (1) the exclusively intellectual type, and (2) the intellectual type with lively sensibility; for the third category, we get voluntary characters having (1) little sensibility and little intelligence (obstinate, opinionated), (2) much sensibility and little intelligence (passionate, violent), (3) much intelligence and little sensibility (cold, energetic characters, a Turenne, a Von Moltke). Classifying them in respect of intellectual objects, we should have egoists and altruists.

M. Fouillée is no doubt right in saying that the germs of intelligence are met with in the first stages of life. Where there is life there is consciousness, memory, and discernment. But when we

speak of intelligence, we understand rather faculties dependent on higher nervous centres, states of reflexion and of full consciousness. Now these states float, so to speak, only on the surface of our mental life. The direction of our will, therefore, does not wholly belong to our intelligence; nor does our soul know of its impulses, nor our conscience contain the sum of all our physiological tendencies. It follows that the three categories of classification proposed by M. Fouillée form a scale and lie one upon another rather than take their places upon the same plane. He admits, even, that classes (1) and (2) of sensitive characters are nearer to the animal life, but I do not see in what respect they are different from the sensitive and active types of M. Ribot. The last-mentioned psychologist appears to me to observe better the principles of good classification, the chief device of which is the subordination of the marks considered.

On the other hand, M. Fouillée recognises that our "sentiments" direct our will, and he also declares that "every sentiment is a state both of intelligence and sensibility." But who is going to deny that our sentiments depend mainly on our sensibility? And if, finally, our "voluntary reaction" is necessarily related to the impressions which provoke it, how can it be denied that our temperament renders us subject to this or that impression, and furnishes our will, so to speak, with its first subject-matter? No, the gap between temperament and character is not so profound as M. Fouillée declares. I must commend his emphasis of the rôle of mind, which is apt to be neglected by modern psychology; but he is wrong in forgetting that the "psychical functions," which are indistinct at the beginning of animal life, never sever their mutual connexions in higher creatures.

It will be impossible for me to discuss the two parts of his book which are devoted to sex and races. He shows himself here the judicious thinker whom our readers have learned to prize, and if there are questions which he does not solve, he has at least the merit of having subjected them to careful scrutiny. Many writers who style themselves philosophers pay no attention to them.

M. G. DE GREEF in *Le transformisme social* gives us, as the subtitle of his work says, "an essay on the progress and regress of societies." In the first part he sets forth in order the beliefs and doctrines relative to the idea of progress and decay; and, imperfect as this rapid review of the philosophies of history is, it can nevertheless be read with interest. In the second part he discusses the facts of retrogression and advancement, and endeavors to extract therefrom their laws. I should not like to say that he has reached exceptionally precise conclusions. His formulæ, whether they deal with commonplace truths or mooted questions, are clothed in a heavy and abstract phraseology.

M. de Greef raises courageously, and that is his strongest point, many important questions—for example, that of the measure of civilisation, or of the characters which enable us to form an estimate of the state of progress or retrogression of a given society. Inspired by the biological conception, he finds progress in the "degree of organisation" of the social body. M. Tarde, on the contrary, will have nothing to do with social organisms, and believes he can classify societies according to the highness of their ideal, and not according to the division or cohesion of their work in respect of that ideal. According to M. Tarde, a social type, an ideal of society, is more perfect the larger the number of divergent "beliefs" and "desires" it harmonises and consolidates, with the result that the agreements of opinions and interests proportionately outweigh the disagreements. But this harmony of beliefs and desires is not revealed, and can only be grasped in the facts; and are not these facts social data of all orders, economical, juridical, religious, etc.? The psychological method lauded by M. Tarde is forced to have recourse in the opposed method which M. de Greef practises. The one party says: "There can be no harvest where man has not sown; it is man who is the maker of his own history." The others say: "The harvest is something in itself, and the methods of operation are not indifferent. What is psychological is the individual; what is social is the collective labor." However that may be, human activity can only be judged by the results which it yields, and these results are

social events, events which have a particular value and are capable of being compared.

Sociologists of the stripe of M. de Greef and M. Durkheim are in danger of invoking mysterious laws or sociological agents,—mere useless entities. Sociologists after the fashion of M. Tarde incur the risk of treating history as a disordered and confused mass of phenomena whose relations are without interest and whose study is without profit. The controversy is far from being ended between the two parties, and occasion will offer itself again for criticism of their curious discussions.

* * *

M. GUSTAVE LE BON gives us, in his *Psychologie des foules*, an interesting work. The growing importance of crowds and assemblies, under the form of public opinion and collective sentiments of all kinds, is beyond doubt one of the striking traits of modern life; they are becoming here a singular factor, which we must endeavor to comprehend. M. Le Bon studies in this volume more especially the crowds and assemblies which he terms *heterogeneous*, whether unnamed (crowds of the streets, etc.) or named (juries, parliamentary bodies, etc.). He intends to take up later the study of homogeneous crowds (sects, castes, and classes).

The distinguishing characteristics of crowds which it is essential to remember are the following: (1) the unconscious elements which are present in individuals and through which they resemble one another are liberated by the contact of the individuals in the crowd; (2) every superior individual loses in crowds a portion of his intellectual ascendancy, the mental level is equalised and lowered; (3) crowds act from sentiment and not from reason; (4) they are fickle for the reason that they are receptive or subject to suggestions and lack all power of criticism; (5) they lapse perforce under the leadership of a chief, a vulgar leader, or a man of conviction and strong will-power. Of all these characteristics, which are already more or less well known, the two first seem to me to deserve most attention, and M. Le Bon has not wholly exhausted their contents. His mode of exposition, moreover, is not without its faults. He does not distinguish clearly between what is individual and what

is characteristic of the crowd. He tells us, for example, that the Parisian public was much less startled by the epidemic of influenza which carried off five thousand persons in a few weeks, than it would have been by the fall of the Eiffel Tower, which would have crushed, say only five hundred persons. The reason of this difference is entirely in the individual and in the nature of the event. A man who has reached the age of fifty years has seen, let us say, twenty persons die, relatives and friends. If he had lost them all in one day or in one year, the impression felt would clearly have been different, more voluminous I might say, and that on grounds which are not at all concerned with the psychology of masses. How, moreover, can M. Le Bon assert that the Homeric poems are praised in sheer deference to fashion, but that in reality their perusal is an insufferable bore to every modern reader. I humbly confess that I enjoy these poems more than I do most contemporary novels. But let us leave this little difference and look at the work of our author in its practical and theoretical significance.

M. Le Bon in his enthusiasm for his subject is on the verge of seeking in the psychology of crowds the key to history, which M. Tarde finds in imitation. There are numerous other keys, and together they make a pretty ring. The truth is, that social phenomena are so complex that there is profit in considering them from several points of view. We then catch gleams of details and even of broader features which escape the eye on a glance at the whole. If the psychology of crowds explains many things, on the other hand it teaches us nothing regarding the reason of their succession; it reveals one of the mechanisms of human history rather than its laws, and as a matter of fact M. Le Bon stops at race as an indecipherable factor, a mysterious enigma. He is sensible that psychological theories are never more than an end of the thread of Ariadne and that we do not possess the plan of the mythological labyrinth.

As to the practical conclusions which he draws from his studies, some are eminently discreet, but there are others which it is more difficult to justify. In some cases he sees things from one side only; often he simplifies problems too much in solving them.

The elasticity of the notion of race does not allow of the rigid deductions to which it sometimes leads him. M. Le Bon finally, lays much stress on the elusive and unreal character of the ideas which have led the world; but he should inquire whether these illusions have not some solid basis. Human happenings alone cannot be considered devoid of meaning in the totality of natural phenomena where on all hands we find order and regularity.

* * *

M. Le Bon has observed in the book which I have just noticed that if socialism is so powerful to-day it is because it is the only illusion which is still alive. Despite all scientific demonstrations, he says, it continues to grow. The crowd turns from proofs which are disagreeable to it and prefers to deify error, if error is attractive. The Preface of the book of M. R. GAROFALO, *La superstition socialiste*, admirably illustrates the foregoing observation, as the reader will remark on perusing the imaginary conversation with the Marxian fanatics. Unfortunately the work of the eminent Italian magistrate is, by the very force of the illusion inherent in the sophisms which he combats, in danger of remaining unfruitful as many other learned works have done. M. Garofalo, it is true, addresses his arguments principally to persons in the middle and higher classes, who imagine that socialism stands for truth and progress. The danger is a real one which comes from the support which the socialists' doctrines have drawn from the authoritative ranks of society. There are reasons why socialism is growing, but it is not an organising power: it is in the eyes of the philosopher one of those forms under which the active dissolution of our social systems disappears. The remedy will be found not in refutations of the socialistic error, but in the correction of the conditions which give rise to it and render it desirable.

* * *

M. PAUL BOILEY in *Les trois socialismes—anarchisme, collectivisme, reformisme*, offers a criticism in this last direction. I could not discuss his book here without going outside the limits of our studies and shall confine myself to recommending its perusal to the reader. A second French edition of the great work of M. C. LOM-

BROSO, *L'homme criminel* has just appeared. It has been considerably enlarged and will find a place in all libraries. Both the second volume and the atlas are completely new. The additions embrace interesting monographs on the criminal from passion, the criminaloid, and the insane criminal, original studies on fetishism in love, etc.

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M. HYACINTHE LOYSON (Père Hyacinthe) publishes two simple lectures delivered in Paris under the title of *France et Algérie, Christianisme et Islamisme*.¹ He studies here first, the law, and secondly, the religion of Islam. His practical conclusions have special importance regarding the relations of France to its Musselman subjects. His theoretical conclusions will be of more interest to American readers. M. Loyson, who is a sincere Christian, declares the inferiority of Islam as compared with Christianity, but he does it with full justice, and strives to emphasise the bonds which unite the religion of Jesus with that of Mohammed, endeavoring to join the souls of their adherents in one single truth. I think, and have remarked it elsewhere, that the inferiority of Islam is mainly that of the races to which it is addressed. Christianity has had the benefit of the rich heritage of Greece and Rome without which it would never have attained its high destinies. No one will deny that there are several Christianities, and it cannot be affirmed of them that they are always and everywhere superior to Islam.

M. Loyson could not treat, much less exhaust, such questions in these simple lectures. But the sincere effort which he makes towards the reconciliation of souls and of races is an act marking an epoch and will not fail of its results: the service of the eloquent preacher will be remembered in the future by all serious men.

LUCIEN ARRÉAT.

PARIS.

¹Dentu, publisher. The other works mentioned are published by Félix Alcan.

BOOK REVIEWS.

DIE SCHÖPFUNG DES MENSCHEN UND SEINER IDEALE. Ein Versuch zur Versöhnung zwischen Religion und Wissenschaft. By *Dr. Wilhelm Haacke*. With sixty-two illustrations. Jena: Hermann Costenoble. 1895. Pages, 487.

Dr. Wilhelm Haacke of Jena, the author of *Die Schöpfung der Thierwelt*, and various other books and essays on similar subjects, has published a new work "The Creation of Man and His Ideals," which he calls in a sub-title "an attempt at a reconciliation between religion and science." We hail the book as a symptom of the times, for it proves that naturalists are beginning to awaken to the importance of the religious problem. Theologians have attempted, in their way, to reconcile science with religion, and have failed. They have aspired to defend their dogmas on the ground of distorted views of natural science. A philosophical solution has been propounded by Herbert Spencer, who, claiming that first principles are unknowable, divides the world into two domains: one, the knowable, for science to investigate; and the other, the unknowable, the haunt of metaphysics, superstitions, and religion. The solution of agnosticism helps religion as little as it does science, for while the main truths of religion are declared to be inaccessible to our comprehension, science is at the same time burdened with the doctrine that the most important facts of life, such as the human soul and the problem of the nature, the existence or non-existence of God, are insolvable riddles. Should not a man trained in the school of natural science be more successful in solving the problem?

Professor Haeckel ventured to propound his monism as the bond between science and religion. But it seems to us, as we stated in a review of his booklet published in *The Open Court*, that he misunderstood the religious import of religious ideas. He failed to understand that religious life belongs to the sphere of psychological, sociological, ethnical, and ethical manifestations, and cannot be regarded merely as an aspect of physics. The idea of God is a concept of moral import, and when Haeckel identifies God with energy and matter (*Kraft und Stoff*) he misses the essential characteristic of God and also of the significance which the idea of God possesses in both the history of mankind and in the life of every single God-believer. Further, when Professor Haeckel identifies the immortality of the soul with the indestructibility of matter and energy, he overlooks the fact that the

aspirations of man, which constitute his soul, are not material things, and the preservation of the atoms of which at the time of death a man's body is constituted has nothing to do with the continuance of his ideas and ideals.

Dr. Haacke's book is quite voluminous, but we regret to say that the bulk of it has nothing to do with the problem to which it is devoted. It is rather a review of the various evolution theories measured by the author's own opinion on the subject, while only a few chapters, and especially the superadded part (*Ergänzungsteil*, p. 429), are devoted, to some extent, to the problem of the reconciliation of religion with science.

The introduction declares that the book aims "to propound a world-conception "based upon the evidence of the oneness of the organic and inorganic natural processes, conceiving religious, artistic, and scientific aspirations in their fundamental unity"; but in spite of this unity of religion, science, and art, the author warns us at once (page 5) not to mix up the domains of knowledge and belief. Yet, if the theologian imagines that this will prove a protection to his dogmas, he is mistaken, for in the first part of the book, which treats of the evidences of the origin of man, Dr. Haacke denies a separate creation, and declares him to have developed from lower ancestors.

In the second part of the book the author reaches his favorite topic; for here he criticises the various evolution theories,—preformation and new-creation, evolution and epigenesis, transformism and creatism. Haacke rejects Darwinism, that is, the doctrine of natural selection, and also its extreme, Weismannism, the theory of germinal selection. The theories of Nägeli, Herbert Spencer, and Eimer are slightly touched upon. Then the methods and results of natural science are briefly surveyed; the import of physiology, the doctrine of the economy of organisms, animal psychology, palæontology, and animal geography are outlined, and the *résumé* is measured by facts. The most important fact, according to Haacke, is the aspiration of organisms to restore the disturbed equilibrium (*Streben nach Wiederherstellung gestörten Gleichgewichts*) which produces their higher and higher consolidation (*Gefügefestigkeit*). This fact, the statement of which is practically the gist of Dr. Haacke's own theory of evolution, is said to be unknown to the Neo-Preformists.

The third part discusses the growth of the various forms of both the inorganic and organic domains. After explaining the nature of crystals and plants, Dr. Haacke speaks of the evolution of animal organisms. "Person" is defined as "an animal form consisting of various layers of cells and in possession of a stomach," There are two kinds of persons: persons without *personelles*, and persons that are in possession of *personelles*, that is to say, such as possess two or more parts which are of equal value. Persons that are in possession of *personelles* are actinozoans, worms, mollusks, crustacea, articulates, and vertebrates. Man is said to consist of two *personelles*, both of which possess the same organs (p. 197). After a review of the persons with a fluctuating or a constant number of *personelles*, with symmetri-

cal and unsymmetrical personelles, etc., etc., Haacke recurs to his law of the organic equilibrium, which serves as a key to all evolutionary problems. In reviewing the older doctrines of creation, Dr. Haacke claims Goethe on account of his *Bildungstrieb* and Karl Ernst von Baer on account of his *Zielstrebigkeit* (page 257), that is to say, an endeavor to attain ends which dominates the entire domain of organised life, as forerunners of his own theory.

The origin of the human form, and of the ancestors of man is the subject of the fourth part. Haacke regards the problem of the unity of mankind as an open question, and he offers on page 314 as a *résumé* a hypothetical sketch of the development of the mammal as an illustration of the way in which the problem of the origin of mankind should be treated.

Next in order is the problem of the creation of the soul to which the fifth part is devoted. Haacke accepts the parallelism of psychical and mechanical processes, but denies that we know anything about the connexion between the two. Sentience and will are inseparable. Wherever sentience obtains, there will is. Memory is said to originate through an equilibration of the various sense-organisations which by mutual interaction produce definite parts of transmission. Haacke declares that every atom must in every definite constellation at a given moment possess a definite sensation and a definite will. In addition, the primitive atom is said to be possessed of memory (p. 339). The higher combinations of the primitive atoms, viz., the atoms of the chemical elements, of the chemical molecules, of gemmaria, and of cells, form the degrees of individualisation of memory. On the basis that the primitive atom (whatever that may be) is already endowed with memory (which, in the reviewer's opinion, is a bold and untenable assumption), Haacke builds his theory of the origin of a hereditary memory, and discusses the various instincts, such as nutrition, copulation, locomotion, nest-building.

The fifth part concludes with an investigation of the nature and origin of human ideals, which have developed gradually and in the same way "as the animal soul is produced by a co-operation of its single constituents of which the ultimate particles are the primitive atoms of matter." The definition of an ideal is (on pages 376-581) given in illustrations. The ideal of a crystal is said to be that which is "as characteristic as possible of its kind" (p. 377). We attain the notion of ideals by forming a spiritual image of all crystals of a special kind with which we are acquainted, after an exclusion of all foreign elements and of all their defects. Ideal, accordingly, is "a combination produced by a process of completion which satisfies our innate demand of unification" (p. 379). The formation of our ideals corresponds to material processes in our brain. Supposing we have formed an ideal of a certain thing, we must assume that certain particles of our brain have accordingly assumed a characteristic arrangement. Thus we are again confronted with the law of an aspiration toward an inner equilibrium which here is of a spiritual nature (p. 380). Having given an explanation of the ideal, Haacke discusses the ideals of beauty, morality, and truth, and coming now at last to the problem of

the origin of religion, which again is explained as due to an aspiration toward equilibrium, and is defined as "the belief in a moral world-order," Haacke says: "He who does not possess this belief has no religion."

The belief in God originates through the necessity of our being obliged to establish an equilibrium of our spiritual life with the surrounding world (p. 391). Polytheism is reduced by civilised man to monotheism by reducing the many causes to the one single cause of the world. This single cause to the civilised man is God, the God of truth, goodness, and beauty. Haacke adds: "It is God himself who 'reveals himself to us, for God is nothing more nor less than this aspiration towards a spiritual equilibrium. The naturalist who investigates the ultimate 'secrets of the world, and the artist who realises the highest ideal in his creative 'imagination, will both find God in the same way as did the Saviour, whose moral 'greatness permitted him to call himself 'the Son of God.' Never a truer word 'has been spoken than by Goethe when he said: 'He who possesses science and 'art has also religion,' and the origin of religion lies deeply founded in existence" (p. 392).

The sixth part is a cursory treatment of the origin of language, which, however, barely touches the problem.

The seventh part discusses the importance of the doctrine of equilibrium for practical life, in art, science, and religion. Haacke declares that "only such a 'religion as allows us to bring our ideals into mutual equilibrium can satisfy our 'demands. If we are right, that the activity of the brain consists in the attainment of equilibrium, and if we can have a feeling of satisfaction only on the condition of, at least to a certain degree, attaining this aim, all those beliefs must be 'rejected which prevent us from attaining a psychical equilibrium" (p. 470). In order to preserve the equilibrium, a religious teacher must, according to circumstances, surrender or modify his dogmas. He should not admit rigid doctrines which allow of no adaptation, and the adherence to immutable credos "may even become directly irreligious" (p. 480).

Under the same heading are treated the principles of nationality and cosmopolitanism, of socialism and individualism, of morality and law, of education and instruction, and national hygiene.

The most important portion of the book is the *Ergänzungstheil*, the complementary part, a kind of *résumé* of the philosophical principles that underlie Haacke's world-conception. Here he explains his view of the nature of cognition. "The 'data of cognition are the various sensations, colors, sounds, odors, tastes, the 'touch of resistance and of temperature, and also the combinations of all these 'things in time and space. These things are the elements from which our cognition grows. Our perception of them forms the elements of our cognition. Cognition consists in our conviction of the necessity of the coincidence of two or 'several events, and our knowledge of this necessary coincidence is as much a 'matter of immediate certainty as our knowledge of the existence of sensations; it

"is of an immediate nature and consists simply in the feeling of satisfaction. A "consideration of the combination of the elementary sensation-complexes leads to "the distinction of extra-sensorial and intra-sensorial processes. The intra-sensorial processes constitute our ego, and thus our ego is the totality of all the things "we know. Our ego is identical with our world. My world is my ego. It is the "complex of all cognition elements, concerning the existence of which I possess an "immediate certainty. When investigating the world I naturally investigate my "ego. When amplifying my cognitions, I amplify my ego. When increasing my "knowledge of the world I increase my ego" (p. 438).

Haacke then propounds the question, whether we are justified in considering the molecular complexes of which the extra-sensorial world may be supposed to consist as sensoriums of other egos, and he says: "In order to answer this question "a discussion is necessary concerning the connexion of all things. But of such a "connexion in the knowable and conceivable world we know nothing at all. It can; "in case it exists, only belong to the world which lies beyond limits of natural cognition. Does such a beyond exist, a transcendental world, a metaphysis?"

Haacke is not prepared to deny the question. On the contrary, he believes that he who denies the existence of the transcendental world of a metaphysis would have to deny the existence of sentiency in his neighbors. The pains and pleasures of other people and the manifestations of their will would be non-existent. He declares that the problem of the existence of a metaphysis does not concern the naturalist. It is a matter of the speculative philosopher, and he, too, is unable to make any definite statements. For, "how can one describe something that is inaccessible to cognition" (p. 443). The realm of metaphysis lies as its name indicates, beyond the limits of natural cognition, "What I can represent in thought does not belong to the domain of metaphysis" (p. 446).

In all these expositions Dr. Haacke shows, in our opinion, a decided lack of knowledge as to the nature of the metaphysical problem, and his own statements are by no means free from contradictions; for a closer study of the nature of the metaphysis will either reveal to him that metaphysis is the psychical correlative of bodily appearance, and as such it is by no means unrepresentable in thought, or, it means some superadded unknowable cause of the real facts of nature, both psychical and physical, and in that case it is a redundant assumption which will avail nothing in the explanation of the world.²

The essence of Professor Haacke's book is summed up in the concluding remarks of the *Ergänzungstheil* on pages 459-461, and as they contain in pregnant form all the points on which we disagree from Dr. Haacke, we deem it best to translate the whole passage which is headed "The Possibility of a Teleological World-Conception," and reads as follows:

² An exhaustive discussion of the problem, in which our own standpoint is set forth, has been published in *The Monist*, Vol. V., No. 4, under the title of "The Metaphysical x in Cognition."

"Teleological is the world-conception which claims that the world-process has a purpose. We have to declare explicitly that a naturalist has nothing to do with teleology or the doctrine of purpose, for the question of the existence or non-existence of a world-purpose is absolutely unanswerable, since it concerns the metaphysics. Natural science can regard the mechanistic world-conception alone as admissible. Thus a naturalist has nothing whatever to do with the question [mentioned on page 184 of Haacke's book] whether a transformation of the blossoms of *Campanula glomerata* in which the three carpels are sometimes replaced by two is teleological or not. He has to deal with the causes only of this transformation. When entering upon the question concerning their purpose or lack of purpose, he would foolishly venture beyond the limits of natural cognition into the realm of the metaphysics, and within the domain of his science any investigation of the metaphysics is forbidden.

"It is strange that Darwinism is constantly praised as the highest wisdom of the mechanistic world-conception and the highest triumph of natural science, while it should have been denounced long ago for tasting of the fruits of the tree of metaphysical cognition forbidden to natural science because absolutely impossible. Darwinism maintains that the world has no purpose for Darwinism is the doctrine of selection,—the doctrine of a selection of that which is accidentally favored. The doctrine of the survival of that which happens to be the fittest. But by maintaining that the world has no purpose, Darwinism blindly enters the domain of the metaphysics which is forever closed to science. In Darwin, who by propounding his theory of natural selection unknowingly overstepped the limits of natural cognition, the abhorrence of the Anglo-saxon to all so-called 'abstruse' investigations found its punishment. Had he busied himself more with 'abstruse' things, he might have recognised that his theory which for the sake of being entitled to existence must deny a world-purpose and thus become metaphysics ventured upon the 'abstrusest' of all domains, upon the domain of metaphysics. And most of the naturalists of the 'nation of thinkers' followed him upon this domain with noisy drums in a jubilant parade and began to propound theories which in their blindness they called anti-metaphysical. However, one of them might illustrate even to the most shortsighted, that their theories are actually metaphysical, I mean the author of the pamphlet on the 'Omnipotence of Natural Selection.'

"But though the naturalist must keep his science clear of metaphysical considerations, he, as an aspiring man is allowed to overstep the limits of natural science so as to propound for his own person the question whether the world has a purpose and whether, accordingly, human existence is worth living. Darwin certainly would have been entitled for his own person to deny a world-purpose, for that is a problem which he has to settle with himself and with his God alone, (supposing that he had a God,) which, however, does not concern natural science, for natural science is and must remain mechanistic. Natural science is allowed

"to become metaphysical only in so far as she propounds the mechanism as a "world-principle. However, as Darwin was allowed to propound privately for himself an anti-teleological metaphysics, every one else is allowed privately to establish a teleological metaphysics.

"We have the choice between a wild chaos and an orderly purpose-regulated 'cosmos, and I believe that he is mistaken who trusts that the choice of most people will be the chaos.

"However that may be, the world-conception here developed gives to science 'what belongs to science and leaves everybody at liberty to give to God what belongs to God."

In reply to this sample of Dr. Haacke's metaphysics, we have to make three remarks. First, on the meaning and scientific import of the word *teleology*. Secondly, on the corollaries of Darwinism which Haacke imputes to Darwin and to the Darwinists, and lastly, on the relation of the God-idea to metaphysics.

Teleology is derived from a Greek word, *telos*, which means "aim, goal, end, or purpose." The question whether the world has a *telos* or not lies by no means beyond the limits of science; firstly because there are no limits to science, for science investigates everything that comes within the ken of the human mind and grapples with every problem that in the course of our mental evolution presents itself. If there is a problem that is *per se* insolvable, we may rest assured that the problem is illegitimate, that is to say, it is wrongly formulated. Secondly, to say that natural science should investigate the causes alone and not the ends or aims or purposes of natural events, is about the same as to declare that we must fix the direction whence a bullet comes but should not ask whither it flies. The solution of the "whence" settles the "whither." The two questions concerning the causes and the ends of motions are inseparable. We cannot investigate the former without gaining an insight into the latter. Thus to investigate the existence or non-existence of a world-purpose is not only not forbidden to natural science but is its main duty. If natural science has nothing to say on this main problem of all problems, we had better give up natural science and resign all attempts at investigating nature.

The confusion by which Dr. Haacke is bewildered, originates, here as in so many other questions, in the misconception of what is meant by *cause*. The word *cause* is sometimes used in its legitimate sense as "that event which through a transformation of circumstances produces a new state of things called the effect." And then again it is used in the sense of *raison d'être*, ground or reason. Whenever we know the *raison d'être* of an event, we know its end, or aim, or purpose. If we are familiar with the nature of gravity we know that the stone tends toward the centre of the earth, that is to say, the centre of the earth is the aim of the stone. If we are familiar with the motives of a man, which in their totality we call his character, we know the aims or purposes of his actions.

The Greek word *telos* means both "aim" and "purpose," and in modern lan-

guages we distinguish between an aim that is unconsciously pursued, as the aim of a falling stone, and an aim that is consciously pursued as the end in view of an intelligent creature. The problem of the world-purpose is by no means as Haacke assumes, insolvable. The theory of evolution is an unmistakable answer to the question of the aim of the world-process, of the law that regulates the main tendencies of all motions and aspirations. Certainly the world-process, that is to say, animated life such as it appears upon earth, does not at its very beginning pursue a purpose, and its aim is not planned by a mind in the fashion of human purposes, but there can be no question about it that the evolution of life pursues a definite direction, the recognition of which is the most important problem of the science of life in its broadest aspect.

Darwinism, as the word is used by Dr. Haacke, is a man of straw whom he can thrash at pleasure. For who, or what is this Darwinism? But Dr. Haacke should remember that the thrashing of straw is a pretty useless performance. If Darwinism means the doctrine of Darwinists, Dr. Haacke should consider that there are Darwinists who believe that the world has no purpose, and there are other Darwinists who believe that the world has a purpose. If he wishes to criticise the former, he had better have quoted the very words of those Darwinists whom he intended to criticise, for it seems to us that it would be very difficult to find Darwinists who accept the conclusions which Dr. Haacke imputes to them. If, however, by Darwinism is meant the doctrine of Darwin himself, it appears to the reviewer that Dr. Haacke is extremely unjust to the great naturalist. Indeed Dr. Haacke's book is full of the most unfair accusations of Darwin, which would be very difficult for him to prove. Any one who has read Darwin knows that no naturalist was so careful to avoid metaphysical speculations and to confine himself to the mere statement of facts. If Haacke intends to criticise Darwin's metaphysicism, he should first state Darwin's propositions impartially and not with additions. Darwin never spoke of the survival of those that happen to be the fittest, but to use the current phrase, simply of the survival of the fittest. Dr. Haacke's criticism applies merely to that which he imputed to Darwin, not to that which Darwin said himself.

Dr. Haacke's reconciliation between religion and science consists in a bi-partition of the world, one half of which is surrendered to science, and the other to God. Thus, God is relegated to a realm inaccessible to science which naturally must stamp upon atheism the imprint of a scientific justification, and science is contrasted to God in such a way as to justify that hatred of science which is so common among fanatics and bigots who denounce science as ungodly and irreligious, because they anticipate from it the destruction of their irrational credos and other dear prejudices. How little tenable Dr. Haacke's proposition is may be learned from the fact that on page 392 he himself, in contradiction to his own principles of excluding metaphysics from the domain of the knowable, defines God as "man's aspiration toward a spiritual equilibrium." Thus, God is to him neither unknowable nor metaphysical, nor transcendental; God is, according to Haacke's own definition, the very kernel of

man's moral being and the most important part of his soul. The nature of God, accordingly, would not be a mere private affair concerning which no one has a right to propound an opinion except quite privately for himself alone; but it would be the most important problem of life, the discussion of which could not and should not be avoided in the most important sciences, which are ethics, psychology, sociology, and also political economy. And this paramount importance of the religious problem, is the position which we have always maintained in all our publications, —in *The Open Court*, in *The Monist*, and in the books that have been brought out by The Open Court Publishing Company.

So long as a man's notion of God is simply an external acceptance of the traditional image of the Deity as it is represented in the symbolical books of the Church, he cannot distinguish between the essential and unessential, between the truth and the allegorical form in which the truth is represented. The existence of such a God cannot be demonstrated, he has simply to be postulated (to use the slang of Kantian philosophy). But after all, what a poor God is the God that must be postulated! For it matters little whether or not a being or a thing exists that lies without the pale of all possible experience.

How radical is the change as soon as we attempt to reduce our notion of God to terms of our life-experiences. Instead of starting with a postulate that never can be proved, we investigate facts and discern between the eternal and the transient; the immutable or everlasting, and the perishable or ever changing; the universal and the particular. The former is the divine, the latter characterises the phenomenal of the creation. The divine, as the law of being, becomes to sentient and aspiring creatures the norm of conduct, for it enforces obedience on penalty of perdition and constitutes the ultimate authority of morality. This is what we call the superpersonal God of the Religion of Science. Whether or not we choose to call this omnipresent reality "God," it is here in us as the most essential part of our experiences and it is also traceable in the world that surrounds us. It is immanent in the universe as the cosmic order of nature, and it is, at the same time, supernatural as the condition of any possible kind of world, for indeed we may imagine that other worlds consisting of some other material existed besides this actual world of ours, but it is impossible that there be any world in which the universal laws (such as are formulated in logic, arithmetic, and the other formal sciences) would have no application.

While we propose a solution of the religious problem that widely differs from the conciliation between religion and science as offered by Dr. Haacke, we heartily recommend his book to a friendly, albeit, at the same time, a critical perusal. P. C.

FRIEDRICH NIETZSCHE, ein Kämpfer gegen seine Zeit. By Dr. Rudolf Steiner.

Weimar: Emil Felber. 1895. Pages, 125.

It is probable that Friedrich Nietzsche, in spite of his erratic and almost insane views, will come to the front in Germany and perhaps even in our country. The

school-philosophy at the various universities of the civilised world has become so self-satisfied and at the same time so barren that a revolution arising from the depths of the instinctive life of the people may be anticipated. Such a philosophy of revolution found an ingenious prophet in Friedrich Nietzsche, a man full of eccentricities, a hater of sound logic, a writer of incoherent thoughts, yet always interesting in his Corybantic frenzy, proud and full of contempt for professional philosophers whom he characterises as personified text-books on logic. However much we sympathise with the aspirations of an original thinker who wants to regenerate the sickly thought of his age, and however much we recommend the study of his ebullitions which are ingenious and amusing at the same time, we cannot prophesy for Nietzsche a lasting success, for his philosophy is self-destructive; it is a philosophy that repudiates clearness of thought and as such it is in itself impossible. In spite of his many affirmations Nietzsche is negative, for all his affirmations are a vigorous protest against the suppression of the various instincts of thought, including those which are illegitimate, because they would not submit to logic, truth, and morality. If Nietzsche really were victorious it would mean an intellectual disintegration of philosophy, science, and ethics.

Dr. Rudolf Steiner is a man who feels an intellectual kinship to Nietzsche. What Nietzsche said concerning Schopenhauer, Steiner applies to his own relation to Nietzsche. He says: "I belong to those readers of Nietzsche who, having read his first page, know for certain that they will read all the remaining pages and will listen to every word uttered by him. My confidence was at once established. I comprehended him as if he had written especially for me." The present booklet contains an almost complete characterisation of Nietzsche, with the exception of his biography, which ought not to have been omitted, especially as his sad death in a state of alienation is quite in harmony with his philosophy of life. We may add that Macmillan & Co. are going to publish a translation of Nietzsche's complete works.

Nietzsche is the philosopher of instinct. He spurns all logical order, even truth itself. He has a contempt for every one who learns from others, for he regards them as slaves to other people's thought. He says in his motto to the second edition of his "Gay Science":

"Ich wohne in meinem eignen Haus,
Hab' niemandem nie nichts nachgemacht
Und—lachte noch jeden Meister aus,
Der nicht sich selber ausgelacht."

"I live in my own house, have never imitated anybody, and ever laughed at every master, who does not laugh at himself."

We wonder that Nietzsche did not think of Goethe's little rhyme, which seems to suit his case exactly:

"A fellow says: 'I own no school or college;
No master lives whom I acknowledge;

And pray don't entertain the thought
That from the dead I e'er learnt aught

This, if I rightly understand,
Means : 'I'm a fool by own command.'

Nietzsche is an individualist who observes that the thoughts of most philosophers are secretly guided by instincts. He feels that all thought is at bottom a "will for power." The will for truth has no right to exist except it serve the will for power. He reproaches philosophers for glorifying truth. When Fichte in his *Duties of the Scholar* says : "My life and my fate are nothing ; but the results of my life, are of great importance. I am a priest of Truth ; I am in the service of Truth ; I feel under obligation to do, to risk, and to suffer anything for Truth," Nietzsche declares that this is shallow. Will for truth, he says, should be called 'will to make being thinkable.' Here, it seems to us, Nietzsche simply replaces the word "truth" by its definition. For what is truth but a systematic representation of reality, a comprehensive description of facts ; truth is "being made thinkable." Nietzsche is perfectly right when he says that truth in itself is nothing, for every representation of reality must serve a purpose, otherwise it is superfluous and useless. And the purpose of truth is the furtherance of life. Nietzsche instinctively hits the right thing in saying that at the bottom of philosophy there is the will for power. In spite of our school-philosophers' vain declamations of "science for its own sake," genuine philosophy will never be anything else than a method for the acquisition of power. But this method is truth. Since the scholars' specialised business is the elucidation of the method, not its purpose, not its application in practical life, Fichte's ideal of the aim of scholarship remains justified.

The will for power, in order to succeed, must be clarified. The contradictory impulses must be systematised so that they would not mutually annihilate themselves ; and the comprehension of this orderly disposition is called reason.

✓ However ingenious the idea of a super-man, as pronounced by Nietzsche, may be, and however cleverly the new word is coined, Nietzsche carries his propositions to such extremes that in spite of many flashes of truth they become in the end ridiculous and even absurd. Nietzsche is on the right track when he ridicules such ideals as "virtue for the sake of virtue," and even "truth for the sake of truth." Virtue and truth are for the sake of life. They have not their purpose in themselves but their nature consists in serving the expanse and further growth of the human soul. This is a truth which we have always insisted upon and which becomes apparent when those people who speak of virtue for its own sake try to define virtue, or determine the ultimate standard of right and wrong, of goodness and badness. We say, that that which enhances soul-growth, thus producing higher life and begetting the super-man is good ; while that which cripples or retards those aspirations is bad. Further, truth is not holy in itself. It becomes holy in the measure that it serves man's holiest aspirations. We sometimes meet among scientists, and especially among philologists, men who with the ideal of "truth for the

sake of truth" pursue some trivial investigations. They resemble Wagner, whom Faust characterises as:

"... a fool whose choice is
To stick in shallow trash for ever more,
Who digs with eager hand for buried ore,
And when he finds an earthworm he rejoices."

Thus there are many trivial truths which are indifferent and the investigation of which is of no account. For instance, whether the correct pronunciation of the Greek letter η was *ee* or *ay* need not concern us much, and the philologist who devotes to its settlement all his life and his best strength is rather to be pitied than admired. Various truths are very different in value, for life and truth become holy according to their importance. This all granted, we need not, however, discard truth, reason, virtue and all moral aspirations as does Nietzsche, who in his superman says: "What is the greatest that you can experience? It is the hour of the great contempt, the hour in which you become disgusted with your happiness and at the same time with your reason and your virtue."

Nietzsche apparently is under the illusion that reason, systematic thought, the moral discipline, self-control, are external powers, and in his love of liberty he objects to their authority. Did he ever consider that thought is not an external agent, but a clarification of man's instincts, and that discipline is, or at least in its purpose and final aim ought to be, self-regulation, so that our contradictory thoughts would not wage an internecine war. Thus Nietzsche, the instinct philosopher, appears as an ingenious boy whose very immaturity is regarded by himself as the highest blossom of his existence. Like an intoxicated youth, he revels in his irresponsibility and laughs at the man who has learned to take life seriously. Because the love of truth originates from instincts, Nietzsche treats it as a mere instinct, and nothing else. He forgets that in the evolution of man's soul, all instincts develop into something higher than instinct and the love of truth develops into systematic science. He never investigates what his self consists of. He never analyses his individuality. Otherwise he would have learned that he has received the most valuable part of his being from others and that that bundle of instincts which he calls his sovereign self is nothing but the inherited heirloom of the ages that have preceded him. In spite of his repudiation of owing anything to others, he is but the continuation of others. But he boldly carries his individualism, if not to its logical conclusions, yet to its moral applications. When speaking of the Order of Assassins of the times of the Crusades, he says with enthusiasm: "The highest secrecy of their leaders was, 'Nothing is true, everything is allowed!'" And Nietzsche adds: "Indeed that was liberty of spirit, that dismissed even the belief in truth." The philosopher of instinct regards even the adhesion to truth as slavery and the proclamation of truth as dogmatism.

Nietzsche's influence is increasing in Germany, as may be learned from the appearance of a weekly journal, *Der Eigene*, which promises to be an exponent of his

modes of thought. It announces itself as "a journal for all and nobody," and "sounds the slogan for all egoists" calling on them to preserve their ownhood. It proposes to antagonise all ideals of the brotherhood of man in the religious, ethical, altruistic, social, and communistic fields. It decries monopoly in every form, wages war against all democratic programmes, all aspirations of equality, including charity-manias in every form and slumming (*Pöbelbeglückung*); it antagonises bureaucracy and all rules. It does not expect social salvation from the socialistic abolition of private property, but from an unimpeded personal appropriation, the realisation of which appears in a free market and the unconditional *laissez faire, laissez passer*. It expects to attain liberty by strengthening the single individual, which is to build up egotistical communities. It repudiates the plan of revolutionising the masses, and the use of violence. It stands up for the pathfinders in literature and art, for personality, for that which is characteristic. However interesting one single thinker may be who defends eccentricity as a principle, we are sure that a whole school of the same type would soon become tiresome. It is quite an entertainment to read Nietzsche, his followers are simply bores. A mode of thought the sole merits of which consist in its originality, loses all value when reproduced in imitations.

KONNTE JESUS IRREN? Unter dem geschichtlichen, dogmatischen und psychologischen Gesichtspunkte principiell beantwortet. By Dr. Paul Schwartzkopff. Giessen: J. Ricker'sche Buchhandlung. 1896.

The same author whose booklet on "the prophecies of Christ concerning his death, resurrection, and second advent," we discussed in the last number of *The Monist*, has worked out another booklet on a problem which is closely connected with his former work and keeps in harmony with the whole plan of a greater work on "God's revelation in Jesus Christ according to its content, extent, and limits," and Professor Schwartzkopff has the happy disposition of hitting the problem which is the most salient of all, and which when solved will elucidate a number of minor problems. Most theologians are busy with minor problems, and do not consider that their solution is of little account so long as those great central problems remain unsolved. The investigation of Christ's prophecies concerning his own second advent lead Professor Schwartzkopff deeper into the fundamental question, Could Christ err?

If we are led to the conclusion that Christ actually did err, our author asks, must we not surrender Christianity, and does not Christ cease to be the God-man in whom God's revelation appeared in its highest and most perfect fulfilment. Professor Schwartzkopff denies these questions with great decision, for he claims that Jesus was not only truly God but also truly man; and his liability to error is one of the most important consequences of his human nature. The problem for a Christian, he claims, is to determine the limits within which Jesus was liable to err.

Although a Christian of outspoken Christian convictions, Schwartzkopff takes

the view, and entering into the details of the accounts of the Gospels proves, that Jesus actually did err. The cursing of the fig-tree not only proves that Jesus sought for figs where if he had been omniscient he ought to have known that there were none. Schwartzkopff spurns the interpretation of the passage that Christ simply for the purpose of conveying a lesson pretended not to know and simulated only to be disappointed, for that would cast the reproach of hypocrisy upon him. The facts of the story are that Jesus was disappointed, that he gave expression to his disappointment in cursing the fig-tree, and also that the gospel writers tacitly presuppose that Jesus could err. It is to them a matter of course that he could be disappointed. If the story is to be understood in the symbolical sense, meaning that Jesus was disappointed to find the Jews not as responsive to his teachings as they ought to have been, this does not change the main question which here also implies disappointment on the part of Jesus.

In a similar way Jesus shows his lack of omniscience by quoting the one hundred and tenth Psalm as a Psalm of David, which, as we now positively know, was neither written by David nor intended to have any reference to a Messiah. The inscription of the Psalm "By David a Psalm" does not belong to the original text, and is an addition of the editors of the Psalms.

The Psalm begins: "A declaration of Jahveh, to my Master. Sit at my right hand until I lay thy enemies before the footstool of thy feet." The singer could not have lived in the times of David, because in David's time the king was at liberty to perform priestly functions. There would be no sense in declaring that, as stated in verse 4, "he should be a priest forever after the order of Melchizedek." There ought to have been a special historical occasion for this peculiar way of addressing the king as "priest-king," and this occasion actually occurred in the history of Israel when the ideal of a theocratic kingdom rose into being under the post-exilic king Zerubabel. The prophet Zechariah (Chap. vi., 12-13) proclaimed that Zerubabel as "the scion" (that is, as the Messiah), should unite the kingdom and priesthood in one person.

Here Jesus, as in several other things, simply accepts the tradition as established at his time in Judæa. He takes it for granted that the Psalm was written by David because the scribes of his time said so, and with their limited means of critical investigation were satisfied that it was true. Similar instances of errors of Jesus are found in his belief in demoniacal possession and also in his reference to "the sign of Jonah."

Schwartzkopff points out that even one instance of an error is sufficient to prove that Jesus could err, but, he continues, that the errors in such points as do not touch his great mission of salvation only prove that Jesus was truly man. It does not disprove that he was at the same time God and the Son of God. Thus the errors of Jesus are unessential in Christian belief, and it is better for Christology to face the problem fearlessly and to state the argument than to avoid the question and shun an investigation which would go down to its ultimate principle. More-

over Schwartzkopff adds: "It is a matter of course that Christianity can only gain by an elucidation of the truth."

Schwartzkopff devotes the main part of his booklet to proving that Jesus, in order to be truly man, must have had a specific human character of his own, which was conditioned by surroundings and the laws of psychological evolution. As in his physical constitution he was subject to all the ailments of bodily infirmities, to disease, pain, and death according to natural laws, so we must grant that his spiritual life, too, was truly human, which includes that under given conditions he was liable to err, to be mistaken, and to be disappointed.

That a liability to error implies moral defects, Schwartzkopff denies, and he contends that sinlessness does not as yet imply intellectual infallibility; and this is the most important point which his booklet makes. The Christian who understands this will no longer have an interest in glossing over errors which a critical investigation of the New Testament will have to attribute to Jesus. There will no longer be any motive for shunning the truth, or to be afraid of the outcome of New Testament criticism. Occasional errors caused by special surroundings, and due to the conditions of the age are not incompatible with the fact that the salient truths of salvation were revealed fully in Jesus who as such is the Christ and the Son of God.

THINKING, FEELING, DOING. By *E. W. Scripture, Ph. D.*, Director of the Psychological Laboratory in Yale University. Meadville, Pa.: Flood and Vincent. Pages, 308. Illustrations, 29. Price, \$1.00.

We approach the task of critically weighing this work with feelings born no less of kindness than of justice. Catching the contagion of the football-season last autumn, professors and valiant knights of the pen all over the country have seemed incapable of conceiving a merrier sport than the belaboring of this poor little book, which is merely designed to popularise in an impersonal manner the results of labors which they or their betters have wrought from a sheer and disinterested love of truth. The reasons for this opposition are not far to seek, and lest our general estimate of the work be taken as an unqualified approbation, we may begin with a catalogue of its salient defects.

The first and most marked feature which has presumably given offence to Professor Scripture's colleagues, is his delightfully straightforward and frigid habit of depersonalising and disindividualising science—particularly when the personality is the mortal vehicle of some other luckless wight. This leaning to the Buddhistic ideal of science is laudable in a certain stage of the development of knowledge; but psychology is yet too young, yet too much colored by yearning and fame-seeking individuality, to undergo such radical and Procrustean disjointment. We have not observed that Professor Scripture has suppressed overmuch his own personality in the citing of scientific results, yet barring the last chapter, which treats of a few of the great investigators in modern psychology, we look in vain for a suitable and

systematic recognition of that vast and rich material which he has drawn from others and whose acknowledgment would, in a humanistic regard, have greatly heightened the value of his book.

The next appalling feature of the work is its Gargantuan verdancy, its Brobdignagian arrogance. It is the mark of a great mind to unbend gracefully, but where grace and art are lacking, it is better it should be avoided. The fall from dignity consequent upon artificial familiarity and patronising, and all limping facetiousness, mar the beauty of a book, and tend greatly, by the raising of vulgar trivialities to the rank of science, to debauch the reader's mind. What impression do we get from the following specimens, to quote only one class? For example: "Are we to suppose that the many Englishmen are color-blind who can see in the Irish flag only a symbol of anarchy?" "How long it would take to recognise an object unwillingly, e. g., a tradesman by an English snob, has not yet been determined." "Alas! our whitest paper is a sorry gray when compared with God's white." Or, the thrilling detective story on page 147: "All is silence. The assassin in his hiding place feels secure from pursuit," etc. Or the wit in the facetious quotation of "'multitudinous syllabifications and frangomaxillary combinations' that pass as philosophic English." And the references to "Robbie" and to "Daisy," to "Baby," to "Kitty and the knothole." Surely these are not things that will make a fellow "laugh till his face be like a cloak ill laid up."

And then as to what we mean by arrogance. There is a mark of presumption reigning in the attitude of the author towards everything not achieved by the *sinker-psychology* of the laboratory. We get the impression that there is naught of merit produced outside its bounds. Indulging in dreams and nonsense in the arm-chair and in the study is unscientific, but toying with pretty brass instruments, smoked drums, mazes of wire, and induction-coils, ringing infinite changes on the one idea of reaction-times, registering the barking-times of dogs and the grunting-times of pigs, fooling generally in the laboratory, is science in its highest and most ineffable essence.

All this rests on a vulgar and erroneous impression of what *experiment* really means—on an erroneous conception of science and on an erroneous conception of philosophy. We are all of us *incarnate bundles of experience*—bundles of mechanical experience,¹ bundles of sociological experience, and pre-eminently bundles of psychological experience. Every human mind is a microcosmic workshop. "Virtually," says Gauss, "we always experiment with our thoughts."² J. R. Mayer reached the law of the conservation of energy without a laboratory; and according to the *character* of the inquiry, this has been the case with many other of the great discoveries of science. It is wrong to say (p. 25) that "Galileo would never have discovered the law of falling bodies if he had not made the experiment." Histori-

¹ See Mach, *The Science of Mechanics*, pp. 83, 304, 26-28; and *The Open Court*, No. 209, 1891, p. 2923, "The Importance of Clearness and the Charm of Haziness."

² See *The Monist*, Vol. VI., No. 2, p. 171.

cally, he discovered the law *before* he made the "experiment";¹ its agreeing with the experiment was good for the law, but it was not the merit of the experiment. The static properties of the inclined plane were not only discovered without "experiment," but the accurate execution of the experiment designed by Stevinus was at the time virtually impracticable: in fact, it was not necessary. True scientific research is really a forestalling and exclusion of *all but a few experiments*—the corrective or corroborative experiments. And this forestalling is done in the head, not in helter-skelter performances in the laboratory. Experiment, properly understood, is the mark and key-note of our age. Its rôle in the establishment of single (and even determinative) facts, in the confirmation of hypotheses, and in the attaining of statistical results, is paramount; but, as a pure laboratory-method, it never made science out of a chaotic mass of facts. And hence it is that we shall continue to read just as edifying and instructive treatises on psychology by the right kind of "arm-chair psychologists" as we shall from some estimable directors of psychological laboratories. We intend no disparagement in these remarks of the remarkable results which "experimental" psychology has achieved; nothing can be accomplished by a psychology that is not experimental, in the proper sense of the word. Nevertheless, the idea or ideas destined to make of psychology a coherent discipline, though they may be evolved by a laboratory-psychologist, will never be the direct outcome of the present laboratory-methods.

More rational is the author's attitude towards philosophy, though even here we hardly think his estimate is adequate (p. 293). Certainly a sound philosophy, or at least a sound philosophic instinct, is more than "helpful" in special science; it is a prime necessity for fruitful and telling work; and we have only to compare the achievements of those who have it with those who have it not, to appreciate its paramount importance. We are also surprised to learn that the positive philosophy based on the special sciences "is very little known outside of Germany" (p. 293). Relatively, and considering the gross output of philosophy in Germany, it is as little known there as in America, France, or in England. But pardonable evidences of a Teutonomanic leaning are noticeable in many parts of the book. On a growing acquaintance with the work of the rest of the world, this tendency in Germany-bred scholars is naturally and gradually reduced to its proper dimensions, as all who have suffered from the contagion will bear witness.

We may now address ourselves with equal frankness to the excellences of the book. They are not few, and are more solid and less adscititious than its defects. The conception of the work, the popularising of the methods and results of an important science, intimately connected with all the action of life, is a laudable one. In the execution of the task, the author has remained true to his intention of writing "plain, every-day English." The presentation in most cases is simple and

¹ Cf. Whewell, *History of the Inductive Sciences*, Vol. I., Book VI., Chapter II., Sect. 2; Mach's *Mechanics*, p. 130; and also the *Dialogues* themselves (German translation promised in the Scientific Classics, edited by Ostwald: Leipsic).

direct. He has perhaps fallen a little short of dignity in the use of catchy titles and illustrations, but he well knows the idiosyncrasies of his public and the methods by which its indifference is wont to be combated. If the people can learn psychology by the channels of Sunday newspaper advertising, then, shades of the gentle Fechner, let them learn it, and let us have more of it! Good medicine is good, surreptitious though be the ways by which it is smuggled into the system.

For the reader of sound average education, not susceptible of the misgivings which attack the bowels of a precisian in science, philosophy, and good literary form, and for the person whose native mental equipment places him beyond the reach of baneful infections of this character, we can cordially recommend the work, as a clear elementary compendium of the methods and results of the new laboratory-psychology—reaction-times, thinking-times, attention, the physics and mechanics of the senses, audition, vision, etc., etc. The descriptions, and accompanying illustrations, of instruments and apparatus, are a capital feature, and of sufficient value and rarity alone to repay the perusal of the work. The mechanical plan and typography also are commendable, and we must not omit to mention the occasional presence of valuable pedagogical hints.

So, then, let us God-speed this book on its course, trusting that our animadversions have not wholly outweighed our commendations, and above all things, that they will not interfere with the sale of a single copy of the book, nor leave a rankling thought in any man's bosom. If they have been frank and hard, they but correspond with the valiant openness with which the author himself has taken a whack at every philosophic pate he sees. "To the latter end of a fray and the beginning of a feast, fits a dull fighter and a keen guest." This audacious fearlessness of the book is its most hopeful quality. A man that will fight will mend.

THOMAS J. MCCORMACK.

DES LIMITES DE LA PHILOSOPHIE. By *O. Merten*. Paris: J. Michelet. 1896.
Pages, 300.

Dr. Merten is Professor of Philosophy in the University of Liège and is the author of a treatise on Popular Philosophy, of another on Ethics, and also of a critical study of Maine de Biran. In the present work he offers a criticism of the possibilities and scope of philosophy which as he claims has been untouched since Kant, yet is the most important of all questions in this domain. He finds that we are living in a period of intellectual lassitude quite similar to that which existed in the time of the great Königsberg philosopher. He asserts that philosophy is still tainted with the discredit which became linked to it in the time of Hegel, and that it is now high time that it should leave off the attempt to solve vain and impossible problems, and devote itself to the more real and pressing tasks of the hour. Either philosophy must perish or renounce entirely those illusions whose pursuit long since demonstrated its infirmity in the eyes of humanity. Philosophy must break definitely with the hypotheses which have been set up so often in the course

of its history and substitute for its gratuitous and hazardous assertions, which have so often impeded the march of the human mind, the severe and rigorous procedures of science. What is needed is the marking off of the real limits of knowledge—a task to which the author applies himself by considering successively psychology, cosmology, theology, metaphysics, logic, ethics, and the State, and showing what can be attained in each. The points are in general well made and the exposition clear and simple. μ.

CORSO DI SOCIOLOGIA. By *Antonino De Bella*. Vol. I. Published by the Author: Nicotera (Calabria). 1895. Pages, 204. Price, L. 8.00.

The present work is the first volume of a projected series of five, entitled, respectively, General Sociology, Genetic Sociology, Juridical Sociology, Criminal Sociology, and Economic Sociology, in which the author proposes to deal exhaustively with all the varied data of social life. The Preface to this first volume on General Sociology has been supplied by Prof. Errico Demarinis. The discussion proceeds upon the basis of a comparison of sociology to biology, and is divided into the following books: (1) Elementary Physiology, treating of the cell and of sex, the tissues, the organs, and the functions of elementary organisms; (2) The Physiology of the Complex Organs, treating of the functions of complex organisms, and of social circulation and respiration; (3) Social Psychology, treating of the senses and motility, propagation and the means of social sustenance; (4) Development and Disease, treating of social pathology and social physics; and (5) of the Data of Psychology, treating of super-organic evolution and of the factors of super-organic phenomena. The masters to whom the author acknowledges special indebtedness are Lombroso, Haeckel, Lubbock, Benedikt, and Schiattarella. As the key-note of the author's idea is found in analogies with biology, he sees great possibilities in store for the human race, and ends his book with a fervent laudation of man's future. The same optimism pervades the entire first volume of the *Corso di Sociologia*, towards which the author has been working his way for several years by preparatory treatises on philosophy, psychology, and jurisprudence. μκρκ.

HEDONISTIC THEORIES FROM ARISTIPPUS TO SPENCER. By *John Watson, LL. D.* Glasgow: James Maclehose and Sons. London and New York: Macmillan & Co. 1895. Pages, 248. Price, \$1.75.

Professor Watson has attempted in this little book "to give, in familiar and untechnical language, a critical account of hedonistic theories in their historical succession." He is convinced, "as a result of this and other investigations, that no hedonistic theory can plausibly explain morality without assuming ideas inconsistent with its asserted principle." He takes up in successive chapters the views of the Greek sophists, of Aristippus, the Cyrenaic, of Epicurus, of Hobbes, of Locke, of Hume, of Bentham, of J. S. Mill, of Herbert Spencer, states them, and appends to his statements his own expositions. We have here in a lucid, simple, and brief

form an excellent summary and refutation of the main historical doctrines of hedonism—a doctrine which has taken a firmer hold of present-day thought than most people are aware of.

THE IMITATION OF S'ANKARA. Being a Collection of Several Texts Bearing on the Advaita. By *Manilal N. Dvivedi*. London: George Redway. Bombay: Pandit Jyestaram Mukundji. 1895. Price, 5s.; and Rs. 3. Pages, 229.

Mr. Manilal N. Dvivedi, one of the most representative spirits of India, has condensed in a neat book of 229 pages the philosophy of the Advaita as held by S'ankara, believing that as Thomas á Kempis wrote *The Imitation of Christ*, and Bowdon *The Imitation of Buddha*, the Hindus should have an analogous book for their great leader of thought, S'ankara, which he has accordingly entitled *The Imitation of S'ankara*.

S'ankara lived at the beginning of the eighth century of our era, and was the very incarnation of strict Brahmanism. He was, as Sir Monier Monier-Williams says, "a more typical representative of Brahmanical doctrine than the legendary Viśva, the alleged author of the Vedānta Sūtra." We know little about S'ankara, except that he founded the monastery of Sringeri in Mysore, and some others in various parts of India. He wrote commentaries on the Upanishads, the Bhagavad-gītā, and the Brahma-Sūtras. The great achievement which he accomplished by his glosses is the systematisation of the philosophy of the Upanishads. In addition there are numerous poems, large and small, which, as Mr. Dvivedi states, "survive on the lip of many a follower of the Vedānta of the present day." He vigorously opposed Buddhism, and became a leader in the reaction which re-established the Brahman religion and the philosophy of Self.

While opposing the Buddhist doctrine of the non-existence of Self, S'ankara adopted those features of Buddhism which had become deeply rooted in the Hindu mind. Says Dvivedi, on page xv. in the Introduction: "He recognised the Truth 'of the Lord's teaching, even to the extent of earning for himself the opprobrious title of a Buddha under Brāhmanic garb."

There is a report that he had used his influence to massacre Buddha's followers without mercy, but Dvivedi says that he is persuaded to believe that the story is not true, as it bears "evident marks of being an invention of those who may not be in sympathy with the Brahmanic revival under S'ankara."

S'ankara, if not the founder of the Vedānta philosophy, is yet its perfecter and main representative. He led "an erratic, restless, controversial life, and died early, probably at Kedārnāth, in the Himālayas, at the age of thirty-two." (Quoted from Sir Monier Monier-Williams's *Brahmanism*, p. 56.)

Dvivedi's book, *The Imitation of S'ankara*, consists of a compilation of passages, which in a forcible manner set forth the Vedānta philosophy. It is a very handy and most convenient collection, which no one that is interested in Indian lore can dispense with. The English translation is accompanied by the Sanskrit text

which makes it easy to refer without trouble to the original, and to verify the translation.

The philosophy which Mr. Dvivedi expounds in *The Imitation of Sankara* is the doctrine of the Self, and its identity with the Supreme Self, which is "the distinctionless, characterless, universal spirit, the properties of which can only be described in the language of contradiction," and is "best explained by the language of utter silence." The word "spirit" is, according to Mr Dvivedi, "Essence, the being of things; not the realistic essence apart from things, but the abstract being wherein all beings partake and exist."

The Self alone is real, while what is commonly regarded as reality is unreal. "The consciousness which is the Self of one, is the same throughout all Selves. What differs is the *form*, the outer manifestation of the inner consciousness. The "pure consciousness is called *Sat* (Being), *Brahman* (the All), *Atman* (Self), *Bhumi* (the Unconditioned), and so on; in truth, it is the Unnamable." (Pp. xxi-xxii.) "The highest moral good is Self-realisation, to which end experience, illusion though it is, provides the necessary training." Mr. Dvivedi declares that Fact is nothing, Idea is everything, and Education leads to the realisation of the Idea. "It is there your pulse beats with the pulse of nature, your heart responds to the heart of the universe, and you find yourself in all and all in yourself. 'Then has he access to all worlds, he has gained the empire of Self.' . . . The Self then melts, indeed, as a lump of salt in the sea."

The philosophy of the Self has its Western analogies in Kant's doctrine of the thing-in-itself and in the dualism of Supernatural Christianity. The Hindu conception is in so far more systematic and perhaps also more consistent, as it attains a peculiar Monism by its negation of the reality of the material universe.

We may be permitted to add, that the Philosophy of Science can accept the doctrine of Self neither in its Western nor in its Eastern garb. Science takes its stand on facts, the various forms of life, and consciousness, far from being indifferent or incidental are the most important feature of reality, while "pure consciousness," or "distinctionless, characterless, universal spirit," is a mere fiction.

While disagreeing with Mr. Dvivedi's philosophy, we warmly recommend his writings, for an essential condition of recognising the truth as a clear comprehension of the logic which led to the espousal of an error; and Mr. Dvivedi is, in his own line of thought, one of the ablest thinkers and a philosophical author of great vigor.

P. C.

THE GHERANDA SANHITĀ. A Treatise on Hatha Yoga. Translated from the Original Sanskrit by *Sris Chandra Vasu, B.A., F.T.S.* Bombay; "Tatva-Vivechaka" Press. 1895. Pages, 138. Price, 12 Annas.

This booklet of altogether 138 pages is very interesting to those who wish to have information concerning Yoga practices. The Yoga philosophy has been explained in almost all books on Brahman philosophy, but the modes and various

practices in which the Yoga was performed is not very well known. Here we have the Sanskrit text of about fifty pages, and a good translation of a book in which the sage Gherapda explains the Yoga to Chanda, his disciple, in seven lessons, which throw much light on things which it is sometimes very difficult for Europeans to understand. The Yoga methods are (1) a purification of the body, which includes practices of rinsing and cleaning all the passages of the body, the nostrils, the mouth, and the whole intestines; (2) postures of contemplation; (3) attitudes, which for some secret reason are supposed to be beneficial; (4) the method of restraining the mind by bringing the thinking principle under the control of self; (5) the practice of restraining the breath and limiting one's food; (6) the contemplation, or Dhyana, which is a trance-producing concentration of thought on objects of reverence; (7) on Samādhi Yoga, or the highest kind of Yoga. This last practice leads to the recognition: "I am Brahma, I am nothing else, the Brahma is certainly I, I am not participator of sorrow, I am Existence, Intelligence, and Bliss; always free, of one essence."

The promises held forth to various practices are such as becoming free of disease, preventing decay, of assistance in crossing the ocean of existence, the accomplishing of all desires, making the body divine, opening the gates of emancipation, preventing premature death, etc., etc. There are repeated injunctions to keep the teachings secret, and to communicate them only to the faithful. Thus we read, for instance, on page 28, concerning the Air-Tatva: "By its virtue one walks in the air. This should not be taught to the wicked or to those devoid of faith. By so doing success is lost; O Chandi! this is verily the truth."

The booklet has an additional interest by throwing light on the methods employed by those who allow themselves to be buried alive. Mr. Sris Chandra Vasu tells on the authority of General Ventura of Paris and of Col. Sir C. M. Wade, of London, a case of a fakir who, in the presence of Runjeet Sing, the Maharaja of Lahore, allowed himself to be buried alive. For preparatory measures it was necessary to cut the *frenulum lingue* and by long practice to elongate the tongue until it could, when placed backward in the mouth, cover the orifice of the hinder part of the *fossa nasales*. Further it is necessary to practise the holding of the breath for a long period. "Novices, in trying the experiment, shut their eyes, and press them with their fingers, as also the cavities of the ears and nostrils, because the natural warmth of the body might cause such an expansion of the enclosed gas as otherwise to produce, by the violence of its pressure, a rupture of some of those delicate organs not yet accustomed by practice to endure it."

The fakir swallowed a small strip of linen in order to cleanse the stomach, and drew a quantity of water through the anus into the intestines, which, with some practice, can be performed while sitting in a vessel filled with water to the height of the arm-pits. He stopped all the natural openings of the body with plugs of aromatic wax, placed back his tongue into his mouth so as to stop the nostrils, crossed his arms over his breast, and thus suffocated himself in the presence of a

multitude of spectators. He "was placed in a chest, on which the Maharaja put a "strong lock. The chest was buried in a garden, outside the city, belonging to the "minister, barley was sown on the ground, and the space enclosed with a wall and "surrounded by sentinels. On the fortieth day, which was the time fixed for his "exhumation, a great number of the authorities of the durbar, with General Ventura and several Englishmen from the vicinity, one of them a medical man, went "to the enclosure. The chest was brought up and opened, and the fakir was found "in the same position as they had left him, cold and stiff. . . . One of the first "operations was to draw his tongue into its natural position; after this, a warm "aromatic paste, made from pulse-meal, was placed on his head, and air was in- "jected into his lungs and also through the ears, from which the plugs are with- "drawn. By this operation the pellets in the nostrils are driven out with consider- "able force and noise, and this is considered the first symptom of his resuscitation. "Friction is then strenuously applied all over the body, and at length he begins to "breathe naturally, opens his eyes, and is gradually restored to consciousness."

The same fakir who was thus buried alive in the presence of General Ventura and the Maharaja of Lahore had been buried alive several times, once as long as four months. As to his later life's history, we are informed that there were complaints about him, and he was suspected of leading an immoral life. The Maharaja intended to banish him, but the fakir anticipated the punishment by eloping with a Katrany (woman of a Hindu caste) to the mountains, where he died and was burned according to the customs of the country.

The author of the present booklet, Mr. Sris Chandra Vasu, believes "that he who can pass four months below the ground without becoming a prey to corruption, may also remain there for one year." And, he adds, "indeed it would be impossible to fix a limit to the time during which the vital functions may be suspended." This, however, appears to us very improbable, as the winter-sleep of a bear is limited also, and would most likely terminate in death if it were greatly prolonged. The suspension of the vital functions can probably be endured only within very definite limits. The story is very strange, but so far as medical experience would allow us to judge, it is by no means impossible.

P. C.

BARLAAM AND JOSAPHAT. *English Lives of Buddha*, Edited and Induced by *Joseph Jacobs*. London: David Nutt. 1896. Pp. 56.

That the same subject should be painted in several Italian churches and in an old Chinese drawing¹ is a very curious fact, which at first sight appears incredible. Yet it is true. It is the famous story of the man in the well, who pursued by a wild beast hangs on the branch of a tree which is gnawed at by mice, so as to leave him no choice but to fall very soon a prey to death, and yet he enjoys himself by eating the honey that trickles down from the tree. The story is one of the old Indian

¹ Published in the *R. As. S. J.*, China Branch, XIX., I., p. 94.

legends that was embodied in the life of Bhagavan Bodhisattva, which tells us of a prince who was educated by his father in a palace where he would see neither sickness nor misery, nor death, and when he once left home, met with the sight of a leper, an aged man, and a corpse, which set him to thinking and induced him to lead a religious life. This story migrated from India through Persia into Roumania and Georgia, whence it spread all over Europe. The original Sanskrit text is lost, but we know enough about Buddha to be sure that a book of that kind might have existed. When translated into Pehlevi, the word Bhagavan was changed into Balavar, the *g* in Persian resembling *l*, and the *n* resembling *r* (Jacobs, p. xlvii). At the same time Bodhisat (that is, one who is to become a Buddha) changed its ending into *asp* which is common in Persian. The Pehlevi was translated into Arabic, where the title was changed into Bellauhar wa Bûdâsaf. The Greek copy, of which a manuscript of the fifteenth century is extant, was probably translated from the Syriac about 600 A. D. In addition we possess a Hebrew translation, a Georgian translation, and a number of others, among which are two Latin translations. From one of the Latin versions most of the Western editions of Barlaam and Josaphat are derived, which are altogether about forty or fifty.

The history of this story is very interesting, as there is no question about its original source and its various fates. Josaphat has been received among the saints of the Christian Church, although, as Mr. Jacobs informs us on the authority of M. Cosquin, "there is all the difference in the world between the two processes [of being regarded as a Saint of the Catholic Church and being duly canonised]. "Inclusion in the Calendar only implies a verdict similar to that of a magistrate's "court or a grand jury; a *prima facie* case has been made out. Before canonisation "can be obtained, the searching cross-examination of the *Avvocato del Diavolo* "must be triumphantly sustained. Modern scholarship has acted the part of the 'Devil's Advocate with the result that the next edition of the Roman Martyrology "will not, in all probability, contain the names of Barlaam and Josaphat."

All the points of interest in the history of the Barlaam and Josaphat story are very interestingly set forth by Mr. Joseph Jacobs, and its pedigree is set forth in a table. The old English version of the "Lyf of Saynt Balaam" is reprinted in full, and the "Life of Prince Jehosaphat" in the London edition, 1783, is reproduced in fac-simile. The book is printed on fine antique paper and presents a very elegant appearance.

IAMBlichus ON THE MYSTERIES OF THE EGYPTIANS, CHALDEANS, AND ASSYRIANS.

Translated from the Greek by Thomas Taylor. London: Bertram Dobell.

1895. Pages, 391. Price, 7s. 6d.

If there is any truth in metempsychosis, we must look upon Thomas Taylor as the last reincarnation of the Greek spirit, and perhaps especially of Plato. He devoted to the study of Greek classics his whole life. He lived the life of an ancient sage. His religion was a belief in the Olympian gods of ancient Helas, and the philos-

ophy of his life was Platonism. Whoever wants a translation of the Greek classics in which the spirit of the original has been preserved, should procure Thomas Taylor's translations, but the trouble is that they had disappeared from the book-market and could only be had by good luck. It is for this reason that the publishers have undertaken to re-publish Thomas Taylor's translations in large print on elegant paper. The book before us, *Iamblichus, on the Mysteries of the Egyptians, Chaldeans, and Assyrians*, is too well known to all Greek scholars to be dwelt upon. We may only say that the translation, so far as we have examined it, is very appropriate and lucid. The additional notes are brief so as not unnecessarily to swell the book. The main defect of the book is the absence of an index which in such a work as the present one is a great desideratum, and should not have been omitted.

K.

A STUDY OF DEATH. By *Henry Mills Alden*. New York: Harper & Brothers. 1895. Pages, 349.

This book is a study of the problem of death, not its solution, and the author has apparently written it to satisfy his own state of mind concerning the saddest experiences of life. The main argument seems to be that at death we shall be changed, but what new embodiment will await us, the author declares, we are unable to understand. A new sensibility would, even in this life, reveal to us a new universe. How much stranger will be the new embodiment which we are to receive in the transformation of death, "that death in which we have no part and that has no part in us." The new embodiment, if not consisting of flesh and blood, need not necessarily be immaterial. It may, and probably will be, a new sensibility and a new thought which will involve space and time as forms to which our corresponding terms of space and time would be merely analogous.

K.

THE THEOSOPHY OF THE UPANISHADS. Part I. Self and Not-Self. London and Benares: The Theosophical Publishing Co. 1896. Pages, 203. Price, 3s. net.

The anonymous author of the present book explains the theosophy of the Upanishads under the following headings: (1) The Beginning of the Way; (2) The Higher Self; (3) The Supreme Self; (4) The Three Worlds; (5) Death and Rebirth; (6) The Way of Liberation; (7) The Eternal; (8) Life and Form; and (9) Conduct. He says that man, while all the time striving for the gratification of desire, is unable to find a resting-place. Desire has no limit, and the things by which we seek to satisfy it are very limited (p. 41). We can assure no complacency to our personalities (p. 67). This is "a dark enough shadow, the treachery of desire, the insecurity of things, the inevitable end of it all; crying, we enter,—this is life; crying, we depart,—this is death" (p. 70). But "the shadow is cast by the dawning inner light," which is "a power within us behind our personalities . . . the self of our very selves" (p. 71). And the doctrine of self is the foundation of

the Upanishads. The author says: "Behind the habitual Self is the Higher Self; "behind and above this, the Supreme Self of all beings, the Eternal. Compared "with this primary reality, all else is unreal, or has only a secondary, inferior, "dependent reality. And this dependent reality, the outward world, the world "outward from the Self, is a power, an energy, a potency of the Self, exercised by "the Self, for the purposes and to the ends of the Self."

From this standpoint, "the only direct reality we have primary knowledge of, is the reality of the Self." While "the existence of not-self is reached by inference, argument, and deduction" (p. 105). The ethics of this philosophy is to establish a unity with the Supreme Self—"the one which appears as many, which gratifies the desires of many, and guides the destinies of the many back again toward "the unity of the Eternal."

The Upanishads have exercised a great influence over mankind. They are those philosophical books which continued the Vedic literature of Old India and prepared that great religious movement which was inaugurated by Gautama Buddha, which, however, was a temporary suppression of the philosophy of the Upanishads; for Buddhism antagonises the philosophy of the Self by denying its existence. Buddhism replaces the belief in Self by a recognition of the spirituality that pervades the facts themselves. After the expulsion of Buddhism from India, the doctrines of the Upanishads became again the dominant philosophy of India, and have remained so to the present day; they are also the gist of theosophy. κ.

DER GEIST DER NEUEREN PHILOSOPHIE. (Part II.) By Robert Schellwien. Leipzig: Alfred Janssen. Pages, 168. Price, M. 2.40.

The second part of Schellwien's book reviews the philosophies of Leibnitz, Jacobi, Kant, Fichte, Schelling, Hegel, and a few later thinkers. The last chapter is entitled "The System of Human Life Outlined," reverts to the author's original views, which we presented to our readers in *The Monist*, Vol. V., No. 4, p. 624. Mr. Schellwien says: "If existence were not all-power, which is identical with "itself, there would be no knowledge; and if man, in his own way, were not all-power, there would be no human knowledge. The creative original power is "immanent in man. . . . In its negativity the all-power is Unconsciousness, or the "life of Nature. . . . Man is at the same time an individual Being and an All-being. [P. 157.] . . . The spirit of man is truly the same spirit that aboriginally "created the world, but in man the spirit displays only a recreative activity, yet "always proceeding from nescience." (Pp. 167-168.) κ.

PERIODICALS.

THE AMERICAN JOURNAL OF PSYCHOLOGY. Vol. VII. No. 2.

SEX AND ART. By *Colin Scott*.—ON THE DEVELOPMENT OF VISUAL PERCEPTION AND ATTENTION. By *Harold Griffing, Ph. D.*—THE RECOGNITION-THEORY OF PERCEPTION. By *Arthur Allin, Ph. D.*—RECOGNITION. By *Arthur Allin, Ph. D.*—PSYCHOLOGICAL LITERATURE.—NOTES.—(Worcester, Mass.: J. H. Orpha.)

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THE INTERNATIONAL CONGRESS OF PSYCHOLOGY AT MUNICH.

The next International Congress of Psychologists will be held on August 4th to 7th, 1896, in Munich. All persons desirous of promoting psychological research are invited to take part in the meetings of the Congress which may be done by sending the name of the paper or address to be read, before the 15th of May, 1896, and by paying the subscription of fifteen shillings. Papers may be read in German, French, English, or Italian, and are limited to twenty minutes. The programme of work consists (1) of psycho-physiology, conducted by Professor Rüdinger and Graetz, and Dr. Cremer; (2) of the psychology of the normal individual, conducted by Professor Lipps, Dr. Cornelius, and Dr. Weinmann; (3) of psycho-pathology conducted by Professor Grashey, Dr. Schrenck-Notzing, and Mr. Parish; and (4) of comparative psychology, conducted by Professor Ranke, Dr. Hirth, and Dr. Folt. The General Secretary is Dr. Frhr. von Schrenck-Notzing, Max Josephstrasse, 2/1.